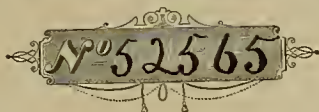


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STATE LIBRARY.



Extract from the Political Code.

SECTION 2296. Books may be taken from the Library by the MEMBERS OF THE LEGISLATURE, DURING THE SESSIONS THEREOF, and by other State officers at any time.

SEC. 2298. The Controller, if notified by the Librarian that any officer has failed to return books taken by him within the time prescribed by the Rules, and after demand made, must not draw his warrant for the salary of such officer until the return is made, or three times the value of the books, or of any injuries thereto, has been paid to the Librarian.

SEC. 2299. Every person who injures or fails to return any book taken is liable to the Librarian in three times the value thereof.

No person shall take or detain from the General Library more than two volumes at any one time, or for a longer period than two weeks. BOOKS OF REFERENCE SHALL NOT BE TAKEN FROM THE LIBRARY AT ANY TIME.—[Extract from the Rules.]

The Foregoing Regulations will be strictly enforced.

MINING AND SCIENTIFIC PRESS.

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VOLUME XLI
Number 1.

First Locomotives in America.

It is about 50 years since the locomotive engine was introduced in the U. S. It came to us from England. Among the many British experimenters with engines for the railway, it is generally conceded that George Stephenson was the first who successfully applied the locomotive to practical use. The railway had been in use in England for years, and many ingenious devices had been tried to supersede the use of horses, the most promising of which, for a time, was the stationary engine. At last the superior judgment and mechanical skill of Stephenson enabled him to avoid or obviate the defects in the machines of Brunton, Trevithick and Blackett, and he succeeded in constructing a locomotive engine, the first successful experiment with which was made on the Hatton colliery railway in 1822. Later on, in the year 1829, in contending for the prize of £500, which had been offered to the builder of the locomotive engine that should most fully meet certain specified requirements, Stephenson's celebrated locomotive Rocket, carried off the prize against three competitors. This successful engine weighed 4½ tons, and made the distance of 12 miles in 53 minutes. An English engine, built about the time of the Rocket's contest, was the first locomotive that turned a wheel on a railroad in the U. S. This is, perhaps, the sum of our indebtedness to England for the locomotive engine; and the obligation has long since been repaid to the fullness of usury, by a series of splendid improvements which have brought the locomotive engine to a state of refined perfection.

The question of priority in the use of the locomotive on railroads in this country is one of perennial interest. The literature on the vexed subject comprises volumes. For the seven cities of Greece, which claimed the honor of the birthplace of Homer, we have had almost as many States claiming the honorable distinction of first introducing the locomotive engines for service on the railroad. The idea of applying steam as the motive power on railroads had occurred to many of our engineers, stimulated as they were doubtless by the successful practice of England; and the introduction of the locomotive by Pennsylvania and South Carolina was almost synchronous; yet the former is fairly entitled to the distinction of priority.

Fortunately there is now living in San Francisco one of the veteran railroad men of the country, who is absolutely familiar with the interesting incidents of the early history of the railroad and the locomotive engine in this country, "all of which he saw and part of which he was." The name of this veteran is David Matthews, now nearly three-score-and-ten. He is a worthy representative of the American mechanic, at once intelligent, alert and trustworthy. In the course of an entertaining conversation with Mr. Matthews recently, we learned that he was born in Scotland and arrived in this country at the tender age of seven, and that a few years later he was sent to the West Point foundry shops in New York City to learn the trade of machinist. It was at these West Point machine shops that the very first American locomotives were built, and where the first English locomotive brought to the country was received and set up and exhibited. And it was also at those famous machine shops that Mr. Matthews met the distinguished engineer, John B. Jervis, whose name and fame are identified with some of the most remarkable engineering projects of the country, and who was the inventor of the plan of putting a truck under the forward part of the locomotive to direct and control the machine in running upon curves—a practice that is now universal and indispensable in the United States where the railroads follow the face of the country. Mr. Matthews has in his possession a copy of the "History of the First Locomotives in America," by W. H. Brown, published in 1874—a book which is chiefly valuable for the information respecting our early railroads which the compiler gleaned from Mr. Matthews and such early and distinguished engineers as Jervis, Allen and Latrobe. The testimony adduced from these intelligent and trustworthy sources is absolutely conclusive; and it would seem that it ought to

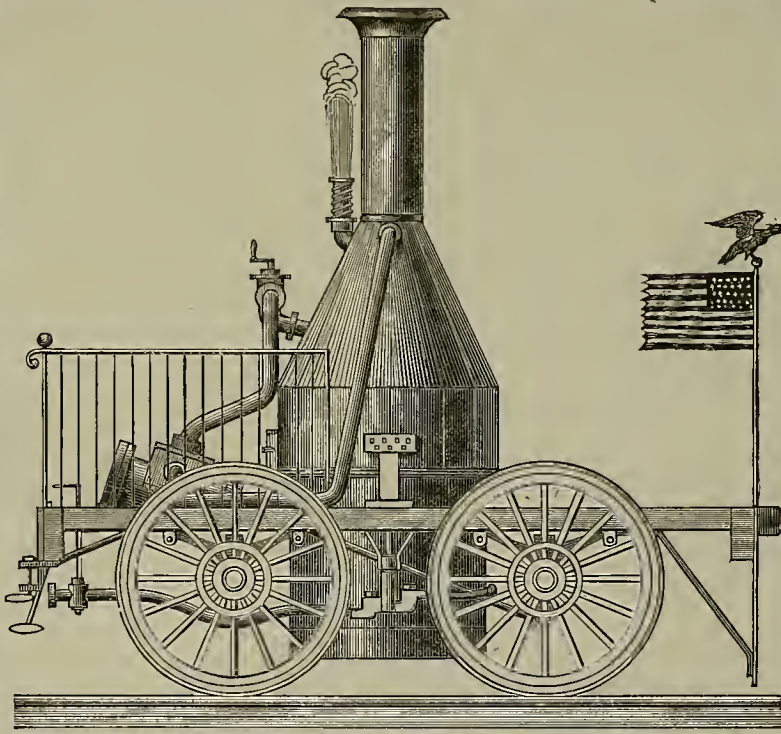
end the controversy about the claim to priority in the first practical use of the locomotive engine in this country. This well attested evidence shows:

1. The first locomotive engine placed and tried on any railroad in America was called the "Stourbridge Lion," and was imported from England for the Delaware and Hudson canal and railroad company. This engine arrived in New York May 17, 1829, and was set up in the yard of the West Point foundry machine shops and publicly exhibited for days to thousands of the first citizens of the country. It was brought from England by Horatio Allen, who made the first experimental trial of it at Honesdale, on the banks of Lackawanna creek, Pa., August 8, 1829, when he "opened the throttle valve of the locomotive engine that turned the first driving wheel on an American railroad." This highly interesting statement was made by Mr. Allen in a speech delivered at Dunkirk on the occasion of the celebration of the completion of the New York and Erie railroad.

trial was made with this locomotive, without any cars attached, at which trial Mr. W. B. Ewer, one of the proprietors of this paper, was present. It was on this occasion that the first American built locomotive turned its wheels for the first time on a railroad track. At the trial on November 2d the wooden wheels of the machine, which were constructed after the English practice, sprung and got off the track; but they were replaced by cast iron wheels, and on December 14th and 15th the engine was again tried and ran at the rate of 16 to 21 miles an hour with five cars carrying about 50 passengers, and without the cars it attained a speed of 30 to 35 miles an hour. In the Charleston Courier, March 12, 1831, there is an account of a later trial of the speed of the "Best Friend," on which occasion, the writer remarks, "safety was assured by the introduction of a barrier car, on which cotton was piled up as a rampart between the locomotive and the passenger cars." The second locomotive for service built in this country was called the "West Point," and was

to enable it to turn sharp corners easily and safely. The machine so constructed was called the "bogie" engine. The first of these engines ever built was for the Mohawk and Hudson road, and was called the "Experiment." It was put on the road and ran by Matthews, who says it was as "fleet as a greyhound." The "Experiment" had been built to burn anthracite coal solely; after a while it was rebuilt and adapted to the use of any kind of coal, and its name was changed to the "Brother Jonathan." Shortly after these changes had been made the English locomotive "Robert Fulton," belonging to the same company was also rebuilt and furnished with the truck, and named the "John Bull." The "Brother Jonathan" was a remarkable machine for those pioneer days. Mr. Matthews says of it: "With this engine I have crossed the Mohawk and Hudson railroad from plans to plans, 14 miles, in 13 minutes, stopping once for water. I have tried her speed upon a level, straight line, and have run a mile in 45 seconds by the watch. She was the fastest and steadiest engine I have ever run or seen, and I worked her with the greatest ease." This is certainly wonderful speed, and may be, as Matthews earnestly maintains it is, the fastest time at least on the American railroad record.

In comparison to this splendid and efficient engine of to-day, our first locomotives, built after the English model mainly, were clumsy and crude machines. Since then our improvements have been manifold and extraordinary, and the American locomotive is now pronounced the most "perfect railroad tool in the world." Its exquisite symmetry and flexibility, and its extraordinary power must fill the mind of a veteran like Matthews—who has watched its growth from its infancy in this country—with feelings of generous admiration and pride. The English and the American railroads and locomotives are strikingly contrasted by a writer in Harper's Magazine for March, 1879. English roads are short, solid, straight and level, and laid with the best rails in this world; and their massive and powerful, and rigid-framed engines are thoroughly adapted to those perfect roads. On the contrary, the American road is generally of great length, and being necessarily cheap it "goes as you please." Over these eccentric roads the American locomotive adjusts itself to every change of level both across and along the line; it takes curves that would be impossible for the rigid English engine; and, finally, it runs over a crazy track, up hill and down, in perfect safety. It has been well said that all that the English engine can do on a perfect road the American engine will do; and much more than this, it will do work on any road, however rough, hilly, curved and cheap. The names of the first American locomotive seems to have been inspired, for it has in the largest sense proved our "Best Friend."



THE "BEST FRIEND"—THE FIRST AMERICAN BUILT LOCOMOTIVE.

2. The first locomotive built in America for a purely experimental purpose was the "Tom Thumb," which was constructed by the now venerable Peter Cooper. This little machine was built for the purpose of testing the feasibility of a locomotive sustaining itself while running over curves, which was a mooted point among the engineers and scientists of that day. The engine weighed less than a ton, the cylinder was only three and a half inches in diameter, the boiler was about as "large as an ordinary kitchen boiler," and was vertical, with gun barrels for tubes. The first trial was made on the Baltimore and Ohio railroad, from the depot at Baltimore to Elliott's mills, August 28, 1830.

3. The first locomotive engine built in America for actual service on a railroad was called the "Best Friend," and was constructed for the Charleston and Augusta railroad company. This pioneer locomotive (which is the subject of our accurate and handsome illustration) was built at the West Point foundry machine shops in New York City, and the work of fitting it up fell to the lot of Mr. Matthews. Immediately after the engine was completed it was placed on the company's road, and the first experiment with a train was made November 2, 1830, N. W. Darrell acting as engineer.

Some few days previous to the above date, or about the 20th of October, in accordance with a notice given in the Charleston papers, a public

for the same road. It was also constructed at the West Point machine shops.

4. The first locomotive built in America for a northern road was called the "De Witt Clinton," and was the third American locomotive. It was for actual service on the Mohawk and Hudson railroad. This engine, like the others, was built at the West Point machine shops, and was also fitted up by Mr. Matthews; and when it was completed he took it to Albany, June 25, 1831, and made the first excursion with a train of cars over the road August 9, 1831. According to Mr. Matthews's statement, the "De Witt Clinton" weighed 3½ tons, and hauled a train of 3 to 5 cars at the speed of 30 miles an hour. It is especially noteworthy that both the cab and the tender of the "De Witt Clinton" were covered to protect the engineer from the weather—a "happy thought" of honest David Matthews, for which all American engineers at least ought to hold him in kind remembrance. About the middle of August the English locomotive, "Robert Fulton," built by the younger Stephenson, arrived and was placed on the Mohawk and Hudson road for service in the middle of the following September.

These locomotives had been used and fairly tested both on the southern and northern railroads, and the necessity for a radical change in their construction had become evident. Very soon John B. Jervis devised the plan of putting the truck under the forward part of the engine

LIFE-SAVING STATIONS.—The sum of \$20,000 appropriated in the Sundry Civil bill for establishing 11 additional life-saving stations previously authorized by Congress, became available July 1st. Of this 11 new stations, the Pacific coast will have two; one at Point Conception, and the other at Bolinas bay. They will be constructed and fitted in a similar manner to the stations now in use, and it is contemplated that they shall be in order for service before next winter. Some difficulty is anticipated in selecting a suitable site for the station at Point Conception, owing to the extra-hazardous character of the coast; but the Life-Saving Bureau will take unusual care in determining the site.

PUBLIC LAND SURVEYS.—On the last day of June the Commissioner of the General Land Office, with the approval of Secretary Schurz, made the following apportionment of the sum of \$300,000 appropriated by Congress for surveys of the public land during the fiscal year, which began July 1st: To Arizona, \$10,000; California, \$35,000; Colorado, \$30,000; Dakota, \$30,000; Florida, \$8,000; Idaho, \$12,000; Louisiana, \$12,000; Minnesota, \$16,000; Montana, \$15,000; Nebraska and Iowa, \$15,000; Nevada, \$12,000; New Mexico, \$12,000; Oregon, \$16,000; Utah, \$12,000; Washington, \$16,000; Wyoming, \$10,000; leaving \$39,000 to be used according to the exigencies of the service during the fiscal year.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Notes from New York.

[By W. E. PARTRIDGE.]

The Topics of To-Day—A Chapter of Accidents.

The topics of to-day are the horrible accidents which have just happened. They are of such a character as to make thinking men look with dread upon our harbor filled, as it is, with light, fast river steamers loaded at almost every trip to their full legal capacity. Their rate of speed is generally high, and though many of them are staunch and well-built boats, there are great numbers of them so small and light that they would ensnare like egg shells if struck by the heavier steamers among which they ply. Perhaps it is because they are supposed to be run by sailors that they escape. It is said that Providence watches over children, drunken men and sailors, or, as the latter puts it, "there is a good little angel that sits up aloft and looks out for poor Jack." Certainly his own watchful care would not prevent a thousand deaths by collision in this harbor every season.

Occasionally we have an accident which gives a hint of what we may expect if we do not make most radical reforms both in construction and management of the steamers and railway trains which run to our watering places.

Accidents to Come.

All New York feels itself in duty bound to go to Coney Island every hot Sunday. On every warm or hot day during the week as many go as can get the time and the necessary 50 cents. The rush is immense, and the demand on the railroads is for the lightest and most open cars that will hold the greatest possible number. How many "excursion" or open cars with cross-seats the Coney Island roads own it is hard to say. They make up very heavy trains of them and run at a high rate of speed. These cars are merely platforms with the lightest possible superstructure. There is nothing continuous above the floor except the roof. In case of an accident of any kind, whether collision or the ditching of a train, the passengers would be spilled out to take their chances with broken seats, trucks, wheels and miscellaneous wreckage. It is enough to make one's hair stand on end to think what would be likely to happen.

Your Felton railroad accident, as far as I can get at the details, was of this character. The cars are reported to have been open, and a small accident at 20 miles per hour sent the passengers on flying among the wrecks of the cars. With a good, strong car body to protect them, the whole affair might have been only recorded as the ditching of a train with a few bad hurts, but nobody killed outright. Be that as it may, we are preparing to have a first-class smash between New York and Coney Island when we get a chance. When it comes it will show that New York can beat the world in a great many things. The

Precautions

Taken in the management, however, to run trains safely greatly diminish the risks by reducing the liability to accidents. In this respect the Supts. of most of the roads deserve a great deal of praise. They are working evidently to the best of their ability. Col. Ricker, I think, understands the danger and is trying to guard against it on his roads.

The Burning of the "Narragansett"

Was one of the most horrible things that has happened in New York waters for many a year. Both boats of the line, the *Narragansett* and the *Stonington*, are old. If this had not been the case, the *Stonington* would have almost cut her sister boat in two at the speed she was going. This opinion is founded on the condition of her bows, which are badly shattered for some distance on each side. Life-boats and life-rafts were out of order, or lashed fast, so that they could not be used. Plugs were out of the boats and cars missing, and, to crown the whole, the officers are reported to have played the coward to perfection. I believe they all saved their skins, some of them without getting wet, if the accounts can be trusted. The captain says he was the last to leave the vessel, and yet he took command of one of the first boats lowered and was carrying passengers off to the *Stonington* all the time. Evidently the stories have not been rehearsed sufficiently.

The Fire

Was rather extraordinary, and goes to show that the conveniences which are so freely used on the great palaces plying on the sound, may be source of great danger. Most of these steamers, as well as those on the Hudson river, are lighted by gas, which is stored in large gas-holders. In some steamers these are on the hurricane deck in the wake of the paddle-wheels, as in the case of the *Massachusetts*. It is supposed that the holders, which are immense rubber bags, were broken when the crash came, and the gas at once took fire from the furnaces. It is said that the fire started very suddenly and had great headway almost at the moment it was first seen. A broken gas tank is in every respect worse, as a means of setting a fire, than

oil. The latter flows about, but the gas carries fire in all directions, and cannot be washed by any common fire apparatus.

The Moral

Of this accident may seem evident to most engineers, but from some vague whisperings I heard to-day, but hardly dare to mention, I should almost be ready to suggest Judge Lynch to hold court at headquarters. The condition of the life boats and rafts of passenger steamers generally in the harbor are enough to startle the bravest men. They do well enough as long as they are sitting in their chocks, but how they could be got out by their own weather-worn tackle and lowered into the water is a question that I don't want to answer.

The "Plymouth Rock."

One of the big excursion steamers, and once, I think, owned by Jim Fisk, had a funny accident the other day. When returning full from down the bay she suddenly began to swing round, refusing to answer her helm. A big crashing in the paddle-box gave the captain a hint of what was the matter. He is rather a cool genius, and went at once to the hand which was playing for dancers on the upper deck and told the leader to "make things lively" and keep doing so. When he opened the paddle-box he found the wheel had just twisted itself all to pieces on the shaft without doing any further damage. The musicians prevented a panic, when the captain set the whistle going as a distress signal.

When the other paddle-wheel gives out there will not be much left of the original boat. This was a funny little accident and no harm was done, so the inspectors say nothing; but suppose it had happened, say two or three days later, on Sunday during the squall, with the steamer outside the bay, say at Brighton beach. The wind would have played the mischief with her, and it would have been almost impossible to have escaped without a loss of life. She is one of the most lofty and top-heavy of our excursion boats, and is very unsteady. The squall, which lasted only for a short time, made it very lively for the *Grand Republic*, which was caught out in it. There was for a time some danger of a panic. Fortunately there was no sea on and no harm was done.

The Collision at Sea.

I had hardly finished writing the foregoing when the news came of a collision which took place on Sunday afternoon (13th) about 300 miles to the eastward of New York, between two ocean steamers. One of the vessels was the *Anchoria*, of the Anchor line. She had left New York the day before for Europe. The other vessel was the *Queen*, of the National line, bound in the opposite direction. The telegraph long before this has given you an outline of the accident. There was a thick fog at the time, and though they heard whistles the vessels were pretty close together before anything could be seen. Meeting almost end on, the *Queen* was turned so as to pass to the right, while the *Anchoria* attempted to pass to the left. The latter vessel, having a greater speed swung faster, and was struck in the side by the *Queen*, leaving a great hole, and filling two of her watertight compartments. That nobody was hurt was wonderful, and that one vessel with her side ripped open, and the other with her bow stove in should be able to steam 300 miles to a port seems almost incredible. It is hard to believe a plain statement of this wonderful accident, and the almost miraculous escape of the passengers. From an engineering point of view the lessons taught are very important. The public are greatly rejoicing over the

Value of Compartments.

As shown by the escape of both vessels. It is questionable upon examining the *Anchoria* whether she would have lived an hour had there been a heavy sea running at the time or afterwards. How deeply she sank in the water from the loss of this buoyancy may be judged by the fact that she came up to the harbor drawing no less than 39 ft. of water. A moderate sea would have probably broken her in two or swamped her.

It is said by several passengers, that the *Anchoria* was going

Full Speed in the Fog.

But the captain states that it was only 12 miles (11 knots) per hour. The other vessel was slowed down to 6. If she had been going faster she would have probably been injured less, but would have cut the *Anchoria* in two.

How Did It Happen?

This is a question that is being asked, but both captains refuse to say a word in regard to what signals they made or what orders were given to their quartermasters or engineers. The companies both issue orders that their captains must not talk about accidents. So, as there is likely to be a law suit, they keep their mouths shut. They have said a few things, however, and the passengers have told all that they know, and in this way considerable light has been thrown upon the subject.

Steam-Steering Gear.

The captain of the *Anchoria*, it seems, considered that, as he had a steam-steering gear to depend upon, he was justified in keeping up a good rate of speed, and if he had known how to use it, this would have no doubt been right. It is a well-known fact that most steamers will turn off at right-angles to their course, if going ahead at full speed, in a less distance than is needed to bring them to a full stop. In other words, if land is discovered dead ahead, and the ship is close in shore, the safest course is to put

the helm hard over, and turn a corner, as a landsman would say. With steam-steering gear this is so quickly done that no time is lost, only a few seconds being needed, as against a minute or more when manual labor is needed for the work.

Steering Screw Steamers.

Screw steamers have been in common use for 30 or 40 years, and during the last 10 years they are the only steam vessels used to any extent for ocean voyages, and yet sailors do not seem to have learned how to steer them. Even when going straight ahead, screw vessels do not behave in the same way as a paddle boat, for the screw is constantly tending to throw the head of the vessel in one direction, and the rudder has to be used to counteract this. When the screw is backing, this action is commonly reversed, yet this fact is not generally recognized by captains. When the screw is going astern, and the vessel still has headway, the whole action of the rudder in one position is reversed, and in another either neutralized or reversed. In examining the accounts of this accident we find that it is clear that the engines of one of the vessels, the *Anchoria*, were backing.

The Rules of the Road.

Landsmen do not generally get a very clear idea of the "rules of the road," as sailors term the directions given by law for passing at sea. Usually in writing about the subject, sea phrases are employed and the matter becomes a puzzle. In the present instance the vessels were meeting head on. Under these circumstances the rule of the road is, in "plain United States," to "keep to the right as the law directs." Unfortunately, the English law, as well as the American, not only tells you what you shall do, but what you shall do in order to do it. It says that the helm shall be put to the left in order that you may pass to the right. The helm is always supposed at sea to be arranged so as to move in an opposite direction from the rudder. Now, what shall he do if, when the helm is as far over to the left as it will go, the vessel's head swings in the opposite direction from what it should?

These two vessels were meeting, as far as I can learn, so as to make a fair and square collision end on. The *Queen* kept her engines going, put her helm over to the left and began to swing to the right. The captain of the *Anchoria* seems to have

Lost His Head.

And was frightened afterwards, for he probably put his helm over to the left and then, without thinking of the result, stopped and reversed his engines. The vessel undoubtedly, from the moment that the screw made the first turn, began to swing rapidly to the left instead of the right, as he expected her to do. When he comes to argue the case in court, if he can prove that the helm was hard over to the left, and that his engines were reversed—"going astern, full speed"—he will probably gain his case in spite of the fact that reversing the screw had in fact reversed the rudder.

The Reason

For this change in the action is to be found, in a measure, in the fact that the screw, when going backwards, creates a forward or following current of water, which strikes the rudder on the back instead of the forward side. The "twist" of the screw is also reversed and that has its influence as well. Here is a fact that can be proven at any time, and has been shown in a great many cases, that is utterly ignored by law and by steamship captains in general. In this harbor not half the tug-boat captains seem to be aware of it. I have seen one more than once trying to get a boat out of a snarl who was entirely ignorant of the fact that the twist of his screw would have got him out of his trouble at once. There are captains on the other hand that know their boats to perfection and can turn them almost on their centers.

I have just learned a fact in regard to the

Steering of the "Narragansett."

Which throws some light on the cause of the accident. Both of the boats of this line, when heavily loaded as they were on the night of the accident, mind their helms very slowly, but when they do swing come round with a rush. The position of the *Narragansett* according to all accounts shows that she had begun to swing heavily. The *Stonington* on the other hand had hardly changed her course. The captains say that an echo in the fog confused the signals, changing by doubling the sound the signal for keeping to the right into one meaning to pass to the left. This afternoon I took a look at the

Bows of the "Queen."

While they are badly stove in at and below the water line, the bowsprit and rigging forward are not injured nearly as much as would have been supposed. Had she been far enough in advance of her position so that the two vessels could have struck bow on, or had she been struck in the side by the vessel going at a higher rate of speed, she might have gone to the bottom head first without saying by your leave.

An Absurd Law.

The general law of the world in regard to steamers, is that they must get out of the way of sailing vessels; if they do not and there is a collision, then the steamer has to pay the bill. Practically this is an absurdity. When any little 40-ft. open boat crosses the bows of the *Germanic* or *Arctica*, or any 5,000-ton steamer that cannot stop in half a dozen times their own length, the law says they must get out of the sailing vessel's way. It is not very differ-

ent from requiring the bigger mule teams on the coast to turn out or stop whenever a man with a hand-cart or wheel-barrow wanted the road. One of these days I hope the law makers will wake up to the fact that a steamer has some rights that a sailing vessel is bound to respect. When they do this they may think it worth while to call a congress of nations, and establish a common sense "rule of the road" for ships at sea.

I had intended to give you some new items about our elevated railroads, but matters afloat were of too much interest, so I send you a naval letter instead.

LAND PATENTS ISSUED.—The Commissioner of the General Land Office has forwarded to the Surveyor-General of California, a patent in favor of Anasto Carillo, his heirs and assigns, for land in the Government's half-mile-square reservation for light-house purposes, amounting to 160 acres within the exterior boundaries of the official survey of the rancho Penila de la Concepcion, Santa Barbara county. A Government light-house was erected there in 1852, and in the patent issued to Carillo in 1863, for the rancho, it was excepted and excluded therefrom. Last April Secretary Schurz held that that action was unauthorized by the law, and by his direction a patent is to be issued for the entire survey outside the reservation. The Commissioner has also transmitted for delivery a patent for two tracts of land, constituting that part of the rancho Agua Caliente confirmed to Mariano G. Vallejo. As patented, the survey contains an area of 1864 acres, and is situated in Sonoma county.

CARP CULTURE.—The *Mercury* is informed that Capt. Fieldsted, who resides about 4 miles east of San Jose, in the foothills, is experimenting in carp culture, and with excellent success. He has a pond 40 by 80 ft. in extent, and 8 ft. deep, fed by a living spring. Last July he procured, at a cost of about \$50, 10 carp, then 4 months old, and weighing about 2 lbs. each. These fish have now grown to from 6 to 8 lbs. in weight, and his pond is thoroughly stocked with young fish. He intends to construct another pond about an acre in extent, and give the fish a chance to spread themselves. The beauty of the carp, for marketable purposes, is the rapidity with which it matures—a few months only being required to bring it into use, while the trout is of but little account before the second year. In all our bill ranges, where living springs and streams abound, fish culture for food purposes could no doubt be made profitable.

SKELETONS FOUND IN THE SHAFT OF A MINE.

At Red Gulch gravel diggings, below the Columbia Crystal Palace cave, some Italians mining there, recently, came upon three skeletons, one of which had a pair of boots on in a good state of preservation. The appearance of the remains indicate that the persons were miners, and had been murdered (probably for their money) and thrown into a shaft or old mining hole; one body was lying across the breast of another. There were many Mexicans, once of a desperate character, hanging around Pine Log, and the North and South forks of the Stanislaus river during flush times of mining, in the early days of California. Near the Crystal Palace cave is a fresh water spring, the only one for miles around. The five acres surrounding it were for many years an old Indian ranch, where hundreds of the natives gathered annually for their harvest dance and summer festivals.

RICH DISCOVERIES ON WHITE RIVER.—The

Carbon County Journal (Wyoming Territory) of a recent date, says that Mr. A. McCargar, a special agent of the Interior Department, and well known throughout Colorado, Wyoming and the West, reports that James McGovern, an old miner and prospector, who has been prospecting up on White river, discovered, a short time ago, about 30 miles above the military cantonment, some very rich silver ledges, assays from which, made at Salt Lake City, gave a return of 700 ounces silver per ton of 2,000 lbs. A number of persons have left White river for the new El Dorado, and Mr. McGovern and party have ordered a large lot of mining tools, including a blacksmithing outfit, and will at once commence work on their locations. The ore is said to be a free milling silver ore.

RAILROAD BUILDING IN ARIZONA.—There are

now, says the *Los Angeles Express*, June 18th, six trains running between here and Arizona, two new ones having been put on yesterday. This makes a departure every day of three trains from each end of the road. The company are pushing on the work of extending the road with increased energy, and say that as soon as they pass the range of mountains the other side of the San Pedro, they will reach a country where they will be able to lay three miles of track every day. They are impelled to this great energy in their work by the rapid movement westward of the Atchison and Topeka road. That road is now so far advanced that Arizona merchants can lay down goods cheaper by it from the East than they can by way of San Francisco. It looks as if the days of competition among the great corporations were approaching.

A Norwegian manufacturer is filling an order from Australia for cast-iron axes, which will be traded with the natives in the northern part of the island for ivory.

MECHANICAL PROGRESS.

A Wonderful Advance in Fuel Arts—
Strong's Water-Gas System.

Some two years since, the representatives of the Strong water-gas process publicly announced that it was possible to convert the best anthracite coal to a gas which should possess a greater heating value than the fuel from which it was derived, for practical purposes. The objection was at once raised that there was an absurd attempt to extract from a given weight of carbon more calories than it contains. The charge was based upon the undeniable truth that the burning of C to CO implies the expenditure of a proportion of its heat, and hence the new form must represent less caloric energy than the old.

Prompt answer was made, admitting this last fact, but explaining that the objection was theoretic and not practical; that the comparison must not lie between the potential energy of a fuel and that of its gaseous product (except for certain limited purposes), but between their several actual energies. It was shown that the theoretic heating powers of fuels are determined by delicate laboratory methods, which, however precise and valuable, are utterly unobtainable by ordinary practice; that the steel makers of Sheffield utilize only 3% of the value so ascertained, consumers in the domestic industries not over 10%, while the most economical use of fuel ever attained, namely, in the largest and most perfect blast furnaces, does not exceed 36%. The better result claimed for some boilers was excluded from the comparison, on the apparently just ground that, as the generation of steam is specifically for the driving of engines, the utilization of heat should be judged by the power developed rather than the weight of water evaporated, and that, so judged, the loss is as great as in other fuel applications.

Evidence was then offered that in the combustion of the Strong gas it is possible to utilize within 10% to 12% of its full theoretic value, and it remained only to make a comparison of results, which was done substantially in the following manner:

One pound of anthracite possesses a potential energy of 13,300 units of heat, of which the actual energy, namely, that realized in practical operation is, as we have already seen, from 3% to 36% thereof, or 405 to 4,960 units of heat, according to the manner of its use. The gaseous products of one pound of anthracite, by the Strong system at that time, was 8,092 units of heat, and an actual energy of from 88% to 90% thereof, or 7,121 to 7,290 units.

Assuming for simplicity what is, perhaps, not an unfair assumption, that the labor-cost of conversion is compensated by collateral advantages in the reduced labor of using gas-fuels, the consumer was left to decide the simple question, from which form of fuel he would realize the greater number of heat units.

This answer on the parts of the advocates of the new system seemed intelligent and correct; at all events, it has never been controverted. Admitting it to be so, we must acknowledge also that the new method of converting carbon in unperheated steam, instead of atmospheric air, represents an important advance in the art of combustion.

More recently, additional facts of great interest have been developed by further experience with the Strong furnace more perfectly constructed. The opinion that a great variety of fuels could be utilized by it has been justified by the results, and the gratifying fact established that all yield nearly identical gases, the variation being not in quality but in volume, which is consistently in proportion to the amount of carbon contained in the fuel. The special excellency of this system in rendering available certain cheap and abundant forms of fuel, heretofore deemed inferior and so neglected, such as small coals, culm and peat-dust, and which were employed in the proportion of three pounds to one pound of the better grade, is now ascertained to have a more important significance than the utilization of cheap material, important as that is.—Geo. S. Dwight, in *Engineering and Mining Journal*.

MARINE ENGINES.—A writer in the *London Engineer*, on the subject of changes and improvements in the construction of marine engines, makes the bold assertion that some of the new colossal steamships recently built for the trade between New York and England hold out the probability that before many years steam navigation on the Atlantic will develop a speed but little if any inferior to that of the average express trains on first-class main lines of railway. It seems to be useless to attempt to dispute the possibility of an achievement of this sort in the age we live in, and without undertaking to discuss the point, our purpose at this time is to ask the very particular attention of iron shipbuilders in the valley of the Delaware to the extreme importance of keeping watch over the changes in the construction of English marine engines, and of the practical working thereof in the new steamships which we have referred to.—*North American*.

To ascertain the size of a driver multiply the diameter of the driven by the number of revolutions you wish it to make, and divide the product by the revolutions of the driver; the quotient will be the size of the driver.

Make Your Own Tools.

This ambition to individualize tools and to adapt them to their users is a characteristic of skillful workmen, and makes a broad line of distinction between the mechanic and the mere laborer. A kit of tools made by the mechanic himself is a recommendation of the mechanic. Few intelligent foremen sneer at this professional pride, or ridicule its visible products. And the possession of a kit of his own tools, made by himself, is not only evidence of the honorable pride of the workman, but is frequently a guaranty of his ability. A workman who can make a good kit of tools, who can shape a cold-chisel, construct a gauge, hang a hammer, or fashion an elegant and handy scratch-awl, and do other good jobs, evidences a pride in his own handiwork that will not be satisfied with half-don't jobs.

The desire of the mechanic to have his own tools made, or at least adapted, by himself, is perfectly natural. With the knowledge of the fact that individuals differ, comes the evidence that what suits the mass is not adapted to the one; that what is for all is not for this particular one. How many machinists are at home in handling a strange hammer? How often the workman drops a hammer he has picked up in haste, and delays an instant until he can reach for, or go for his own! This is not foolish fastidiousness; for those who most stick to their own tools are old, experienced workmen, who have outgrown the false pride which would make them insist on their way as the only right way. The fact is that the workman is the best judge of the adaptability of a tool for himself, and if he does not make and fashion his own, he at least chooses and modifies those produced by others.

This necessity, or the advantage of adaptability, received an illustration recently, when a smith, an expert forger of iron and steel, with 20 years' experience, showed the writer a hammer with a split handle, saying, "That is the best hammer in the shop to finish off a forging handsomely." The fact was that he had not dared to shave down the hickory small enough in the neck of the handle to give it the "feeling" spring to his hand, for fear of breaking it in use, when a foul blow in the hand of an apprentice split the handle, and made it the handiest one in the shop.—*Exchange*.

A POWERFUL TESTING MACHINE.—E. and T. Fairbanks & Co. have completed two or three large testing machines lately ordered by the Government to be used in testing the strength of iron and steel. These machines are very compactly built, occupying but about five ft. square on the floor, and about ten ft. high—all of iron and steel, and weighing four tons each. The metal to be tested is clamped securely between two heavy iron collars, which are drawn apart by two heavy screws turned gradually by hand with a combination of gear wheels. The testers are really weighing-machines also, having levers, beams, poise, etc., and as fast as the power is applied to the metal to be tested, the poise on the scale beam is moved automatically, indicating the number of pounds of strain applied. At a trial a bar of steel an inch and an eighth wide and five-sixteenths thick stood a strain of over 41,000 lbs. before it was pulled apart, and before it broke it was reduced in width an eighth of an inch, and in thickness nearly a sixteenth. So heavy and powerful are these machines that there was no perceptible recoil when the steel parted. The one tested as above is going to Cincinnati; and just to test its strength, a heavy bar of steel was placed in its jaws, and 100,000 lbs. strain put upon it without any visible effect.—*St. Johnsbury (Vt.) Caledonia*.

AVOIDANCE OF VIBRATION BY MACHINERY. Mr. W. H. Delano, in a paper read before the British Institution of Civil Engineers, suggests the use of asphalt for the foundation of machinery, notably for those running at high speeds, the asphalt having the valuable quality of absorbing vibration. This was instanced in the case of a Carr disintegrator, which, being mounted in a pit lined with bituminous concrete, was worked at 500 revolutions per minute without sensible tremor, whereas with the former wooden mountings on an ordinary concrete base, the vibration was excessive and extended over a radius of 25 yards. In the Paris exhibition of 1878 there was shown a block of bituminous concrete, weighing 46 tons, forming the foundation of a Carr disintegrator used as a flour mill, and making 1,400 revolutions a minute, a speed which would have been impracticable on an ordinary foundation. Extensive applications of the material for this purpose are made in France, especially in connection with steam engines and steam hammers.

AN IMPROVED MACHINE FOR WORKING METAL, WOOD AND STONE has recently been patented by Mr. R. R. Atchinson of New York, the main novelty of which is claimed to be the movement of the bits, which have a continuous rotary motion, as well as an alternating percussive stroke. This arrangement facilitates the work, while the tool is not subject to as rapid dulling as is usual with similar machinery. The new tool is said to cut granite at the rate of 45 square ft. per hour, the depth of the cut being 1-16 of an inch, the tool striking 6,000 blows per minute and outlasting one hour's work. The mechanism is similar for working wood or metals.

SCIENTIFIC PROGRESS.

"Evolution Admitted, What Then?"

It is gratifying to note an obvious subsidence of alarm on the part of eminent divines in regard to the acceptance of evolution doctrines, accompanied by the bolder enunciation of rational views respecting religion. Dr. E. O. Haven, Chancellor of the University of Syracuse, and now a Methodist bishop, sends a communication to a leading religious journal under the above title, which is full of significant foreshadowings that are worthy of notice.

Dr. Haven utters a very important truth when he says: "Men are prone to associate their religion with its drapery. This becomes obsolete and must be changed, and the looker-on fancies that the very body and soul are gone." This is the view of science. Religion, like other things, is progressive, and proceeds from stage to stage, successively molting its integuments with increasing expansion and a higher life, or, by the figure of Dr. Haven, shedding its worn-out clothing as occasion requires. It is a great point gained in this matter to discriminate between the living body and its accidental and temporary wrappings—between perennial truth and its obsolete accompaniments. The credal habiliments are not the vital thing they invest, and to cling to them as if they were is superstition. Dr. Haven's point of view enables us to appreciate the triviality of denominational creeds, its styles; and illustrates the futility of venerating theological rags and tatters instead of the essential religious ideas which require ever to be clothed anew as men grow in grace. And what a pitiful spectacle, moreover, it is to see people so confused and perverted in their notions as to actually worship the heaps of old clothes that have been long ago worn out and cast off.

We are glad to observe that Bishop Haven does not recoil from the conception of creation as a continuous, ever-unfolding work. He wisely accepts the view of God, compelled by evolution, as that of an eternally-creating Spirit. He says, "Is there any reason whatever to believe that God at any past period, large or small, had any more or less to do than now with this earth and all that it contains?" And again: "Had we all been educated in a theory of gradualism and constancy and improvement, and thoroughly saturated with it, and yet aroused into a profound belief in God, as is certainly conceivable on that theory, and then, should the theory of a Deity sometimes awake and sometimes asleep be suggested, it would shock some feeble minds into atheism." But would not strong minds also be thus shocked, and justly so; and would not the atheism be real? When evolution has become an established and familiar idea in the religions world, and the Creative Power is conceived—as far as such conception is possible to finite faculties—as the mighty, ever-energizing spirit of which the boundless universe is but the manifestation, a reversion to present current notions of the method of creation will assuredly be regarded as a lapse into atheistic paganism, analogous to a present backward plunge into fetishism.—*Prof. E. L. Youmans*.

ASTRONOMICAL.—A writer in the *Providence Journal* says: If the planet Neptune was discovered or supposed to exist on account of certain perturbations in the movements of Uranus, and if the erratic movements of Mercury reveal the presence of planets within his orbit, why should not the near approach of Jupiter to the sun stir up a commotion in his fiery elements? The sun is still diversified with spots, and the planet is near enough to perihelion to make his influence felt. Astronomers have been wise prophets thus far as to the influence of the commencement of the sun-spot cycle. Tornadoes and cyclones of extreme severity have borne witness to abnormal conditions of the atmosphere, and a wave of intense heat, such as has not occurred for a quarter of a century at this season of the year, has confirmed the exactness of previous observations. We must still expect the usual storms, waves of heat and auroral displays that follow the maximum of sun-spots; we have yet to learn whether the coincident perihelia of the four great planets will increase and prolong the elemental warfare. This is one of the most interesting problems of the day, as well as one of the most practical and important. It will not meet with a hasty solution, for the period of observation extends to the year 1855.

HERR RUDOLF FALE, a well-known astronomer, has returned from his travels in South America, and believes he has made important discoveries as to the original language of the human race.

A GERMAN chemist is said to have discovered a substance which may be used as a substitute for phosphorus in the manufacture of matches. We are not informed what the substance is.

M. DUMAS has observed that aluminium will occlude as much as one and a half times its volume of hydrogen gas, and traces of carbonic acid.

The Fossil Man.

Prehistoric archaeology, the latest-born of the sciences, like her elder sister, geology, has lived through the successive stages of scornful denial, doubt, and unwilling assent, and has finally won for herself substantial recognition. The "antiquity of man" is now an established fact. Even its most strenuous opponents are forced to concede that there are proofs of his existence during a lapse of time far exceeding the limits of the previously approved chronology. For somewhat of the suspicion with which this result has been received, certain of its advocates may have themselves to blame. Where absolute chronological determinations were of necessity impossible, and where, even at the present stage of the investigation, only general approximation can be reached, it was at least injudicious to startle received opinion, and to arouse prejudices, by asserting for mankind an antiquity of hundreds of thousands of years. Moreover, the great name of Cuvier was held up as a barrier in the path of those who claimed to have discovered proofs of man's existence under geological conditions different from the present. Cuvier, however, never denied the possibility of finding "the fossil man"; he only questioned the sufficiency of the evidence of his existence which had been brought under his notice, and with great reason, in view of the numerous instances in which pretended fossil bones had turned out to be those of animals, or even merely natural formations.—*H. W. Haynes, in Popular Science Monthly*.

MICROSCOPIC TESTS.—Mr. B. G. West has succeeded in tracing on glass the curves called after Lissajou. He has traced these in lines of 55,000 to the inch, and finds that they are much better for testing the power of a microscope than straight lines. Aside from their great beauty, and the necessity of skillful illumination to see them well, the intersection of some lines and the gradual approximation of others, arising from the variation in the figures, where every degree of the sharpness of a curve is obtainable, from a line returning almost upon itself at an exceedingly acute angle, to curves so flat as to present in parts virtually the appearance of parallel straight lines—all this, combined with a knowledge up to a certain point of the nature of all lines cut in glass, makes these rulings more instructive perhaps than the markings on diatom valves, in regard to which there is as much question. A curious feature of some of these figures is that though all the lines would seem to be in the same plane, it sometimes happens that an alteration of focus is requisite to bring out the transverse lines. The same fact has been noticed in observing the transverse markings of the diatoms.

SOURCE OF MUSCULAR POWER.—The theory has been adopted by many physiologists of late years that the muscular system of a fully developed man, or other animal, in health, is merely a perfected mechanical apparatus which accomplishes work like a machine, not at the expense of its own substance—replacing it by the assimilation of food, but using the food directly, converting it into force without transforming it into muscle. Dr. Flint, however, in a recent work, examines this theory and gives the results of a series of observations by himself and others, having for their object to test its correctness. After the most careful tests practicable, his conclusions are in opposition to the theory of direct food conversion, and lead him to adhere to the older assumption of muscular waste and repair, the muscles being their own source of power.

SALICYLIC ACID IN DRINKING WATER.—Prof. Kolbe, the discoverer of the antiseptic properties of salicylic acid, recommended some time ago that drinking water, used by sailing vessels on long voyages, might be preserved from fouling by the addition of a small quantity of this agent. Experiment has shown, however, that this expectation is not realized where wooden casks (untarred) are used. The wood substance appears to completely destroy the acid, so that after a very short time not a trace of it can be detected. The same experience has been made with salicylized wines in casks.

THE SURVEY OF THE GULF STREAM.—The sundry civil appropriation bill, just passed by the House of Representatives, provides for a survey of the Gulf stream from its origin to its final whirl around the Sargasso sea. The plan embraces soundings, deep-sea temperatures and current observations. The high importance of the proposed survey is clear and when done it will add another valuable chapter to the nation's record of scientific explorations. The practical value of the proposed work, in its bearing on commerce and meteorology, is beyond estimation.

A NEW ELECTRICAL PRINCIPLE.—Prof. Lemstrom, of Helsingfors, has made the singular observation that a ring of insulating material, when rotated about its axis of symmetry with a high velocity, acts like a galvanic circuit, and produces a magnetic "field" in the space within it. This experiment is quite inexplicable, and *London Nature* is disposed to regard it as a fundamental fact in the physical theory of electricity.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending June 4.	Week Ending June 11.	Week Ending June 18.	Week Ending June 25.
Alpha.....	8 42	6 51	5 51	5 42
Alta.....	2 2	2 40	2 40	1 55 1 95
Andes.....	80c	75c	80c	65c 90c
Alps.....	50c	45c	55c	40c 45c
Argenta.....	50c	45c	55c	40c 45c
Aurora Tunnel.....	50c	30c	55c	35c 35c
Baltimore Con.....	15c	2 23	2 10	2 20
Belcher.....	15c	2 23	2 10	2 20
Best & Belcher.....	9 8	8 8	8 8	8 8
Bullion.....	2 2	2 1	2 1	1 35 1 45
Bechtel.....	45c	1 1	1 10 1 15	1 1 1 05
Belle Isle.....	8 8	7 7	6 7	6 7
Benton.....	1 30	1 1	1 30	1 1 1 10
Bulwer.....	5 5	5 4	4 90	3 4 2 95
Boyle.....	15c	2 23	2 10	2 20
Black Hawk.....	3 3	2 20	2 60	3 5
Belvidere.....	3 3	2 20	2 60	3 5
Booker.....	80c	30c	75c	60c 40c
Caladonia.....	80c	60c	70c	60c 50c
California.....	1 45	1 45	1 10	1 10
Chollar.....	3 3	3 15	3 10	2 50 1 10
Confidence.....	5 5	5 4	4 4	4 4
Con Imperial.....	40c	35c	40c	35c 25c
Con Virginia.....	3 3	3 10	3 45	3 15 3 30
Crown Point.....	1 30	1 33	1 1	1 65 1 1
Con Washoe.....	1 1	65c	1 20	85c 75c
Champion.....	85c	80c	90c	75c 75c
Concordia.....	85c	80c	90c	75c 75c
DeFrees.....	15c	2 23	2 10	2 20
Danby.....	55c	60c	60c	65c 50c
Day.....	13c	13c	13c	13c 13c
Deer Creek.....	2 10	1 1	2 10	1 1 1 10
Excelsior.....	2 10	1 1	2 10	1 1 1 10
Endowment.....	8 8	8 8	8 8	8 8
Gen Thomas.....	1 10	95c	1 05	1 1 1 35
Grand Prize.....	1 10	95c	1 05	1 1 1 35
Golden Chariot.....	1 10	95c	1 05	1 1 1 35
Golden Terra.....	1 10	95c	1 05	1 1 1 35
Goodshew.....	1 10	95c	1 05	1 1 1 35
Hale & Norcross.....	3 30	3 10	3 45	3 15 3 30
Hillside.....	75c	45c	75c	55c 40c
Highridge.....	75c	45c	75c	55c 40c
Homestake.....	75c	45c	75c	55c 40c
Independence.....	35c	30c	75c	30c 60c
Justice.....	75c	35c	50c	40c 75c
Kentucky.....	2 2	2 2	2 2	2 2
K K Con.....	4 4	4 4	4 4	4 4
Kentuck.....	2 2	2 2	2 2	2 2
Kosuth.....	2 2	2 2	2 2	2 2
Lady Bryan.....	35c	30c	30c	25c 30c
Lady Wash.....	35c	30c	30c	25c 30c
Leopard.....	25c	10c	20c	20c
Leviathan.....	25c	10c	20c	20c
Lead.....	30c	20c	50c	30c 45c
Lee.....	30c	20c	50c	30c 45c
May Belle.....	30c	20c	50c	30c 45c
Modoc.....	30c	20c	50c	30c 45c
Meadow Valley.....	9 9	8 8	8 8	7 8
Midian.....	9 9	8 8	8 8	7 8
Morning Star.....	30c	15c	25c	20c 15c
New York.....	30c	15c	25c	20c 15c
North Bell.....	12c	12c	11c	10c 11c
New Coso.....	25c	20c	25c	20c 25c
Nevada.....	1 40	1 1	1 90c	1 80c 1 90c
Oberlin.....	8 8	6 7	6 7	6 6
Oberlin.....	1 85	1 70	1 10	1 85c 1 85c
Panther.....	1 85	1 70	1 10	1 85c 1 85c
Pebble.....	2 80	2 4	2 30	2 40 2 2
Prospect.....	25c	20c	20c	5c 5c
Raymond & Ely.....	25c	20c	20c	5c 5c
Richer.....	20c	10c	10c	10c
Rye Patch.....	3 20	2 30	2 70	2 40 2 70
Sage.....	3 20	2 30	2 70	2 40 2 70
Sierra Nevada.....	15c	13c	13c	10c 11c
Silver Hill.....	70c	55c	60c	55c 45c
Silver King.....	5 4	4 4	4 4	5 5
Succor.....	2 1	2 1	2 1	2 1
Summit.....	2 1	2 1	2 1	2 1
Scorpion.....	1 65	1 1	1 70	1 35 1 35
Solid Silver.....	30c	15c	25c	20c
Standard.....	30c	15c	25c	20c
Star.....	1 05	90c	2 1	1 90c
St. Louis.....	1 05	90c	2 1	1 90c
Tioga Con.....	7 5	6 6	6 6	6 6
Tiptop.....	20c	15c	15c	10c 15c
Trojan.....	20c	15c	15c	10c 15c
Union Con.....	1 1	9c	9c	9c 10c
Vermont Con.....	1 60	1 1	1 30	1 1 1 30
Vella Fargo.....	1 60	1 1	1 30	1 1 1 30
White Cloud.....	6 6	5 5	5 5	5 5
Yellow Jacket.....	6 6	5 5	5 5	5 5

Sales at S. F. Stock Exchange.

Thursday A. M., July 1.	200	Albion.....	40c
Alpha.....	4 35	Albion.....	40c
Alta.....	2 2	Albion.....	40c
Andes.....	80c	Albion.....	40c
Alps.....	50c	Albion.....	40c
Argenta.....	50c	Albion.....	40c
Aurora Tunnel.....	50c	Albion.....	40c
Baltimore Con.....	15c	Albion.....	40c
Belcher.....	15c	Albion.....	40c
Best & Belcher.....	9 8	Albion.....	40c
Bullion.....	2 2	Albion.....	40c
Bechtel.....	45c	Albion.....	40c
Belle Isle.....	8 8	Albion.....	40c
Benton.....	1 30	Albion.....	40c
Bulwer.....	5 5	Albion.....	40c
Boyle.....	15c	Albion.....	40c
Black Hawk.....	3 3	Albion.....	40c
Belvidere.....	3 3	Albion.....	40c
Booker.....	80c	Albion.....	40c
Caladonia.....	80c	Albion.....	40c
California.....	1 45	Albion.....	40c
Chollar.....	3 3	Albion.....	40c
Confidence.....	5 5	Albion.....	40c
Con Imperial.....	40c	Albion.....	40c
Con Virginia.....	3 3	Albion.....	40c
Crown Point.....	1 30	Albion.....	40c
Con Washoe.....	1 1	Albion.....	40c
Champion.....	85c	Albion.....	40c
Concordia.....	85c	Albion.....	40c
DeFrees.....	15c	Albion.....	40c
Danby.....	55c	Albion.....	40c
Day.....	13c	Albion.....	40c
Deer Creek.....	2 10	Albion.....	40c
Excelsior.....	2 10	Albion.....	40c
Endowment.....	8 8	Albion.....	40c
Gen Thomas.....	1 10	Albion.....	40c
Grand Prize.....	1 10	Albion.....	40c
Golden Chariot.....	1 10	Albion.....	40c
Golden Terra.....	1 10	Albion.....	40c
Goodshew.....	1 10	Albion.....	40c
Hale & Norcross.....	3 30	Albion.....	40c
Hillside.....	75c	Albion.....	40c
Highridge.....	75c	Albion.....	40c
Homestake.....	75c	Albion.....	40c
Independence.....	35c	Albion.....	40c
Justice.....	75c	Albion.....	40c
Kentucky.....	2 2	Albion.....	40c
K K Con.....	4 4	Albion.....	40c
Kentuck.....	2 2	Albion.....	40c
Kosuth.....	2 2	Albion.....	40c
Lady Bryan.....	35c	Albion.....	40c
Lady Wash.....	35c	Albion.....	40c
Leopard.....	25c	Albion.....	40c
Leviathan.....	25c	Albion.....	40c
Lead.....	30c	Albion.....	40c
Lee.....	30c	Albion.....	40c
May Belle.....	30c	Albion.....	40c
Modoc.....	30c	Albion.....	40c
Meadow Valley.....	9 9	Albion.....	40c
Midian.....	9 9	Albion.....	40c
Morning Star.....	30c	Albion.....	40c
New York.....	30c	Albion.....	40c
North Bell.....	12c	Albion.....	40c
New Coso.....	25c	Albion.....	40c
Nevada.....	1 40	Albion.....	40c
Oberlin.....	8 8	Albion.....	40c
Oberlin.....	1 85	Albion.....	40c
Panther.....	1 85	Albion.....	40c
Pebble.....	2 80	Albion.....	40c
Prospect.....	25c	Albion.....	40c
Raymond & Ely.....	25c	Albion.....	40c
Richer.....	20c	Albion.....	40c
Rye Patch.....	3 20	Albion.....	40c
Sage.....	3 20	Albion.....	40c
Sierra Nevada.....	15c	Albion.....	40c
Silver Hill.....	70c	Albion.....	40c
Silver King.....	5 4	Albion.....	40c
Succor.....	2 1	Albion.....	40c
Summit.....	2 1	Albion.....	40c
Scorpion.....	1 65	Albion.....	40c
Solid Silver.....	30c	Albion.....	40c
Standard.....	30c	Albion.....	40c
Star.....	1 05	Albion.....	40c
St. Louis.....	1 05	Albion.....	40c
Tioga Con.....	7 5	Albion.....	40c
Tiptop.....	20c	Albion.....	40c
Trojan.....	20c	Albion.....	40c
Union Con.....	1 1	Albion.....	40c
Vermont Con.....	1 60	Albion.....	40c
Vella Fargo.....	1 60	Albion.....	40c
White Cloud.....	6 6	Albion.....	40c
Yellow Jacket.....	6 6	Albion.....	40c

We understand, says the *Reese River Reveille* of June 24th, that an important strike has recently been made in the Alameda mine, adjoining the Brooklyn, at Grantsville. We are not in possession of anything farther pertaining to the development.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co	Nevada	12	1 00	May 12	June 16	July 7	W Willis	309 Montgomery st
Atlanta M Co	Utah	1	05	Jan 2	June 24	July 19	A F McGrew	420 Montgomery st
Bechtel Con M Co	California	5	25	June 12	July 20	Aug 9	W H Lent	309 Montgomery st
Belcher S M Co	California	23	50	June 28	July 15	Aug 3	J W Crockett	327 Pine st
Booker Con M Co	California	5	20	May 10	June 15	July 7	W H Lent	309 Montgomery st
Bullion M Co	Nevada	15	1 00	June 2	July 7	July 27	J M Brazell	328 Montgomery st
Concordia M Co	California	3	15	June 1	July 8	Aug 2	Wm J Taylor	310 Pine st
DeFrees G M Co	California	5	25	May 20	June 23	July 21	W H Lent	309 Montgomery st
Hale & Norcross	Nevada	12	1 00	May 17	June 14	July 6	E A Holmes	324 Pine st
Mc Potosi Con M Co	Nevada	3	2 50	May 11	June 14	July 6	E A Holmes	318 Pine st
Metallist M Co	Nevada	3	25	June 9	July 13	Aug 3	Wm Willis	309 Montgomery st
Mt Diablo M & M Co	Nevada	3	2 00	June 22	July 26	Aug 16	Chas N Shaw	408 California st
Hale & Norcross	Nevada	64	50	May 11	June 16	July 8	J F Lightner	309 Montgomery st
Julia Con M Co	Nevada	12	40	May 12	June 16	July 8	E A Charles	413 California st
Jupiter M Co	California	9	40	June 14	July 16	Aug 11	E C Masten	18 Nevada Block
Justice M Co	Nevada	32	50	May 22	June 26	July 19	R E Kelly	419 California st
Mammoth M Co	California	5	50	June 16	July 27	Aug 27	A W Ross, Jr.	302 Montgomery st
New York King M Co	Nevada	13	15	June 7	July 12	Aug 12	D L Thomas	327 Pine st
North Bonanza S M Co	Nevada	6	25	June 30	Aug 4	Aug 25	W M Stetson	309 Montgomery st
Ophir S M Co	Nevada	38	1 00	June 4	July 9	July 29	C L McCoy	309 Montgomery st
Overman S M Co	Nevada	46	50	June 10	July 16	Aug 6	G E Edwards	414 California st
Savage Nevada S M Co	Nevada	61	1 00	June 22	July 27	Aug 23	E B Holmes	309 Montgomery st
Phil Sheridan G & S M Co	Nevada	10	25	June 22	July 24	Aug 14	D L Thomas	327 Pine st
Red Hill Con M Co	California	7	20	May 11	June 17	July 19	W J Taylor	310 Pine st
Union G M Co	California	6	12	June 10	July 14	Aug 3	Wm L Oliver	328 Montgomery st
Yellow Jacket M Co	Nevada	37	1 00	May 22	June 30	July 20	M Oley	205 Bush st
Wells Fargo M Co	Nevada	14	10	May 26	June 23	July 19	A Colburn	313 Pine st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Argonaut M Co	Arizona	1	03	May 26	July 3	July 24	J Pentecost	702 Market st
Cumberland G & S M Co	Arizona	1	30	June 8	July 19	Aug 9	J H Griffiths	328 Montgomery st
Empire G & S M Co	California	2	10	June 4	July 7	July 26	Jno McGeehan	318 Pine st
Excelsior Deep Gravel M Co	California	10	10	Apr 21	May 24	June 15	D F Verdenal	327 Pine st
Gover M & M Co	California	42	20	May 5	June 21	July 14	W O Wilson	402 Front st
Highridge S M Co	California	2	17 1/2	June 19	July 26	Aug 11	E J Friedlander	310 Pine st
North Bonanza S M Co	California	2	17 1/2	June 19	July 26	Aug 11	E J Friedlander	310 Pine st
McCracken Con M Co	Arizona	5	40	June 26	Aug 1	Sept 20	A Wenzelburger	216 Sansome st
Morgan M Co	California	6	50	May 14	June 21	July 15	J J Raphael	533 Kearny st
Monte Cristo Con M Co	California	3	10	May 26	July 5	Aug 5	Butler Burris	309 Montgomery st
New York King M & M Co	California	3	20	May 14	June 19	July 12	E A Holmes	310 Pine st
Original Keystone S M Co	Nevada	3	50	May 26	June 29	July 21	F E Luty	330 Pine st
Oberlin Con M Co	California	4	03	June 14	Aug 5	Aug 25	W T Smith	402 Montgomery st
Paris M Co	California	1	10	June 1	July 7	July 30	Wm J Taylor	310 Pine st
Red Hill M & W Co	California	3	03	June 15	July 3	Aug 2	A B Paul	328 Montgomery st
Rocky Point M Co	California	3	05	May 22	June 23	July 19	T L Perkins	314 Bush st
Swamp Angel G M Co	California	1	12	June 2	July 24	Aug 12	Chas W Badger	315 California st
Telfair M Co	Arizona	3	01	June 8	July 17	Aug 7	J Pentecost	7

will be repaid by a handsome reward. The mine is running with 1,400 inches of water, of which 1,050 inches are forced through a 7½-inch nozzle by 250 ft pressure.

EL DORADO.

YOUNG HARMON.—*Mountain Democrat*, June 26: This mine has been prospected by several different parties at different times, but none of them seem to have had the means of doing the work thoroughly. The present owners are sinking a main shaft and also a winze in the tunnel. Some very rich rock has been taken out. A wagon road is being constructed from Camblers' gulch, and the 10-stamp mill there is being completely renovated.

WEBER TUNNEL.—This tunnel has reached the shaft at Coon Hollow. Drifts will now be run in various directions to determine the character of the gravel.

PLACERVILLE G. O. Co.—The hurdy-gurdy wheel which drives the company's mill is about to be changed for one of another form; the inventor, Mr. Knight, claiming a great saving of water over the present one. About 30 tons of quartz per day is the average crushing at this mill—nearly 1,000 tons per month.

PLACER AND GRAVEL TREASURES.—Some new and very rich placer ground has been found near Brownsville which is creating quite a stir in that neighborhood. The ranch on which the discovery was made has been put into claims, and lively work is being done. Gil Knox and Charley Varozza have driven a tunnel 150 feet into the gravel on the hill, over the Sacramento road. They are now in gravel 3 feet thick, which prospects from 5 to 15 cents to every pan. **GEORGEOWA NOKS.**—There has been a strike of gold for some time, but it is not yet known whether it is a vein or a bring water on Spanish Flat and divide from rock creek.

OLD CHICKEN FLAT MINE.—The machinery for this mine is on the ground. This is another large, well-defined lode, 8 ft wide on the surface, and gradually widening as it goes down. There are about 300 tons of ore now on the dump, from which about \$30,000 have been taken by the miners process, and still the ore will pay from \$5 to \$14 per ton, by mill.

GOSHUTE MINE.—This mine is prospecting well. They are crushing rock, and the battery plates showed well after 14 tons had been put through.

KAPERANZA.—This mine will probably have a mill upon it in a short time. This is a lode of great strength. It is over 30 ft in width at a depth of 170 ft, and traceable through the country 1½ miles. There is no doubt of its richness.

ITEMS.—The Chaparral mine is erecting a 10-stamp battery, which will be ready to run in a short time. The Rising Sun is worked with a 4-stamp mill, of about 4-ton capacity, and it is said that this small mill one-half of the proceeds is profit. Parties connected with the C. P. R. came up lately looking into some of the mines in Greenwood district, in which they were interested. They have purchased the Lemann claim at Hogg's Diggings for \$10,000.

INYO.

HARSEN MINE.—*Independent*, June 19: The mine is situated about 1,200 ft above the valley, and consequently over 5,000 ft above sea level. It is a 4-ft ledge, carrying 3 ft of ore, and lies in a general strike in a general formation of slate and limestone. The ledge has been opened in 2 places; in 1 to the depth of about 20 ft, and several tons of ore have been extracted. From a small streak on the west wall of the ledge comes a heavy, black ore carrying lead, copper and silver. In the center is a gray quartz, bearing both gold and silver. The bulk of the ledge, however, is a heavy, red oxide of copper, and the seams of which are found filled with chunks of native copper.

BEVERIDGE DISTRICT.—Messrs. McEvoy & Taylor, of the Freeborn Canyon Works, Beveridge district, came in lately with 63 ounces of fine gold. This is the result of an experimental run on a new mine, the ore of which does not appear to have worked more than \$30 per ton, although only a partial clean-up was made.

BISHOP CREEK NOTE.—J. Stoutenborough, on his return from San Francisco, became quite elated at learning that there was a strike on his desert land claim. Experts say there is no telling where it will lead.

RESTING SPRINGS.—*Cor. Independent*, June 13: This camp has not been worth speaking about for the past 3 months, but lately it has been galvanized into new life by the arrival of C. E. Luckhardt, M. E., from San Francisco, and who has full authority from the company to do as he pleases. He is now in charge of the camp. The mill is running day shifts only, but to-morrow will begin to run day and night. Most of our people had got tired of waiting, and have struck out for newer and better camps.

MONO.

BODIE DISTRICT.—*Free Press*, June 22: During the week 1,044 tons of ore, from the 300, 400, 450 and 550 levels of the Standard Con., were extracted. The average pulp assay was \$31.33. The amount of crude bullion received was 4,510 ounces, and the amount shipped by the company, \$45,048.07. The new shaft has been sunk and timbered since last report 7 ft, making a total depth of 342 ft.

LAST CHANCE.—*Supt. Graham's* weekly report of the 19th inst. says: "Since my last letter I have uncovered a ledge 5 ft wide, with a regular hanging and footwall, and of good milling ore, which has been taken out. The amount of ore during the week, same period, 417 tons of ore, from the 200, 300 and 400 levels, were extracted, the average assay of the pulp being \$10.02. The south drift on the 300 level has been advanced 17 ft on the Ralston vein. The south drift on the 400 level has been advanced 24 ft on the Stonewall vein. The stopes continue about the same.

SUMMIT.—The south drift has been extended 12 ft; total ledge, 83 ft. The ledge is 12 ft wide. The east crosscut has been advanced 25 ft; total length, 90 ft. The face is in hard-blasting ground. The south drift, east Summit vein, has been run 12 ft; total length, 35 ft. The ledge is 3 ft wide. The upraise on this ledge is up 20 ft. The ledge is 4 ft wide.

ADDENDA.—The east crosscut is now advanced from the station 25 ft. The amount of quartz and ore coming in the face. The indications are that they are over the ledge. The east crosscut has been advanced 48 ft.

SOUTH NOONDAY.—*News*, June 22: The north drift on the 250 level has been advanced 12 ft during the week; total length, 36 ft. The whole face of the drift is in ore of a good quality. The ledge is fully 10 ft in width, and is steadily improving as progress is made.

QUEEN BEY.—The south drift on the 400 level has been advanced during the past week 25 ft, making a total length of 146 ft. The ledge has been constantly improving in strength and quality, and now shows a face of 5 ft of good milling ore.

SOUTH BULWER.—South drift on the 550 level has been advanced during the week 12 ft; total length, 33 ft. North drift, same level, advanced 14 ft; total length, 42 ft. Face from south drift has now attained a depth of 14 ft. In all the different workings the ledge is looking well and carrying a fine quality of ore.

MARYLAND CON.—The south drift, 250 level, of the Maryland Con. has been driven 125 ft. A vein 2 ft wide, in a soft porphyritic formation, was struck at the bottom of the old incline shaft. Passing into hard rock further south, this ledge again became an almost invisible seam, but quite recently this has widened—again in a soft formation—to fully 2 ft, and is still widening. Assays of ore taken from the face of this widening vein run up to \$60. The 3 ledges cut by the east crosscut, 500 level, are full of good milling ore.

MAMMOTH DISTRICT.—*Herald*, June 23: Good headway is being made in the shaft sinking on the Last Chance mine, the ground being very easy. The southern portion of Mineral hill is fast coming to the front with its many rich ledges of gold and silver.

NOTES.—B. N. Lowe, of Lake district, on Monday visited some of our mines, including the True Blue, Monte Cristo, and other mines on the top of Mineral hill, and was highly pleased with the general outlook.

THURSDAY DISTRICT.—The miners are informed that a party of miners arrived from Fresno last Saturday to commence their summer's work in this new district. There are many large ledges in the district, from which assays rich in gold and silver have been obtained from the croppings. The character of the ore is similar to that found on the rich

surface croppings on Mineral hill, in this district, and appears to be a continuation of the same. **BENTON DISTRICT.**—*Cor. Mammoth City Herald*, June 19: Work has been resumed at the Clover mines. The Wild Rose is looking fine. The tunnel connected last fall is now in the ledge some 18 ft, and no signs of the outer wall. They have run 2 drifts to find the 2d wall—1 south, the other north. I saw 3 assays made from the mine that went as follows: No. 1, from the north drift, \$31.21; No. 2, from the bottom ledge, 1 set No. 3, 3 ft, from the south drift, \$24.80. There is a small streak in the mine, which increases as they sink, that goes in the hundreds—from \$900 to \$900. The Oro Fino will be worked this fall and the coming summer.

NEVADA.

EMPIRE MINE.—*Grass Valley Union*, June 26: As soon as the mine is pumped out, the work of sinking the main incline for another level will be commenced. The Rich Hill lead will also be worked through the crosscut from the Empire. In the Empire mine, above the level of the drain tunnel, there is considerable ground that can be now worked, and the company will let out to tribute.

DRAWING MINE.—The Dobree drift mining company, of North Bloomfield, (and has been for some time past) in a very rich body of gravel, and the deposit has every indication of possessing greater permanency than the most sanguine friends of the property formerly hoped for. During the past 30 days the clean-ups have averaged fully \$500 per day. The company will at once make arrangements for commencing work on a short tunnel which it is expected will produce enough gravel from the start to pay the cost of running. When this is completed it is contemplated to run a long tunnel, working at both ends and pushing it through as rapidly as possible.

GOLD RUN M. Co.—The Supt. informs us that he has put a force of 15 men at work on this company's claim down at Gold Run. They commenced work this week, making preparations for their work on the short tunnel, in which they expect to arrive from San Francisco in less than 10 days. The mill will be used for crushing the hard cement gravel immediately on the bedrock, which is too hard to wash without first being crushed.

MERRIFIELD MINE.—The Merrifield ore carries a large amount of auriferous sulphurets, and for the efficient and economical working of the same it has been determined to erect extensive elimination works for their reduction. The works are to be constructed with all the modern improvements. The main building will be 90 by 68 ft, with store-room, vat-room, furnace, smelting-room, etc.

AMERICAN MINE.—*North San Juan Times*, June 26: This mine is looking well, and the ground they are now washing looks as though it would pay well. The company is working the mine as economically as possible. Since the construction of their water pipe, they have now covered the mine formerly, because of less friction. The mine was never in a better condition for working than now.

SOUTHERN CROSS AND POLAR STAR.—*Dutch Flat Forum*, June 26: They had a clean-up in the Southern Cross mine last week. We are not informed as to the amount of gold taken out, but it was quite large, judging from the fact that the company owning this mine has been hiring and sending out men to work on the mine, and some of them have more. The work, both in the Southern Cross and Polar Star mines, is being pushed along as rapidly as possible.

ITEMS.—We understand the Cedar Creek ditch company's ditches and mines will change hands in a few days. It is the intention of the new owners to put the ditch in thorough repair and commence operating the mines soon. **FOUSTAIN HEAD MINE.**—*Cor. Herald*, June 26: Lately the company owning this mine has been working on the north side of the ridge near Fraser's ranch. The incline on the south side, which had reached a depth of 80 ft, has been abandoned. The projectors expect to be compelled to sink some 400 ft before tapping the channel. The Cold Spring tunnel has indicated recently that the lead extends along the north side of the ridge.

MEADOW LAKE.—*Cor. Transcript*, June 23: A New York concern has secured a great many claims in this district, and is now working the Badger. They have reached the ledge by means of a tunnel, and have crosscut it for a distance of 34 ft; all good ore, and at present have no indications of reaching the footwall. The shaft they are now sinking is down 70 ft, in ore all the way, but no crosscuts have been run to determine the width of the ledge. The first 15 assays made from the croppings and working level yielded an average of \$200 per ton, some of it running as high as \$900. Machinery has been ordered from the East to work the ore, of which they have a vast amount on the dump, and it is expected to arrive daily.

U. S. GRANT MINE.—Across Red Mountain from the New York company's works, we reach the U. S. Grant mine. The mill of this company, which was crushed by a snowslide in April, is being repaired. The have an 8-ft ledge carrying splendid assays.

GARFIELD M. Co.—The Caselle mining company, owning an extension of the Grant location, are developing their property, and have great confidence in its future value. The ledge where they are working is about 30 ft wide and gives good assays.

PLACER.

BIG GUM CLAIM.—*Herald*, June 26: The Van Emom Bros. are approaching the close of a short but very successful season. Their mine has paid better this season than it has any season for 10 years. At this time when the mine owners and capitalists are reducing the wages of their employees, this sterling old firm pay the same prices they paid 20 years ago, and their mine will enable them to do so for 20 years more. During the winter season they pay \$3.50 per day, and \$3 during the summer months. By this means they secure good, reliable men. Some of their present hands have served them for 15 years.

PLUMAS.

BELL MINE.—*National*, June 26: The strike in the Bell mine so far proves permanent, and a good showing of very rich quartz has been developed by the work. The ledge is 6 ft through, and is made fairly clean with good milling ore. The ledge is steady, as yet from rock from the upper levels, and is paying well.

RICH QUARTZ.—Rumor says that Mr. J. A. Edman is developing a high quartz mine in Eagle gulch, and that the owners have cleaned up over \$2,000 with a hand mortar during the past winter. They are putting up a large water-arabstra, and will make money at a lively rate when they get to work.

PEDERAS DITCH AND WATER CO.—This company is making a splendid run this season, and has already shipped over \$30,000 as the result up to this time. Last week a dividend of \$5 per share was declared. The water is yet "booming," and the run is not more than half over. They have an inexhaustible supply of gravel, and their big pipes do splendid work.

SHASTA.

SODA SPRING NOTES.—*Reading Independent*, June 24: The miners have begun to clean up, and their prospects are flattering. By the way, we have had some excitement on Soda creek in regard to Chinamen. One man proposed to sell some mining ground to Chinamen, and the miners called upon the party wishing to sell to persuade him that his contemplated action was not agreeable to the public at large. The Chinamen have nearly exhausted all the bars on the Sacramento river; also Dog creek and Slate creek. In fact, where they have been allowed to work, they have made a clean sweep.

FLAT CREEK MINE.—The Murray mine, considered one of the best mines in the district, is down about 80 ft, with a well-defined ledge of excellent ore. Six men, under the direction of Mr. Shepler, are now engaged in running a tunnel to tap the mine. This claim is no doubt very rich.

BLACK ROCK.—This mine adjoins the Murray, and is down about 45 ft. This mine is owned by Lee Pader and others, and the rock improves in quality as they descend. The miners are engaged in running a tunnel to give an outlet for the water in the mine.

LITTLE ROCK.—The Little Rock, just above Black Rock, owned by Hunter & Berry, is down only 0 ft, with an 18-inch vein of good looking ore.

NOTES.—The Last Chance is down 25 ft on first-class

ore. In addition to these there are several other locations of more or less value. These mines are owned by poor men, consequently the progress made in developing them is not rapid.

SIERRA.

ANTHUP MINE.—*Mountain Messenger*, June 26: An interest in this mine has been sold to parties who are making arrangements to push work on the same. This claim is located west of the famous Brush Creek mine, and immediately adjoining it. Some very rich specimens have been taken from the ground, and there is a tunnel in about 400 ft. The new owners will put on 3 shifts at once and push work, and 400 ft further, it is believed, will tap the ledge.

NOTES.—Work has been commenced on a tunnel in Caribou ravine. It is about 40 ft higher than the tunnel started there a few years ago. We were misinformed in regard to the stoppage of work on the Savage Placer tunnel. There has been no cessation of work, and the tunnel is going ahead at a fair rate of speed. It is reported that the Black Jack mine, Jim Crow canyon, began crushing rock last week. The property is owned by Senator Jones and Budd Noble.

TUOLUMNE.

BLUTHUR CON.—*Independent*, June 20: This mine is situated on Deer Flat, 1 mile from Groveland, and is 1 of the early-cropper mines in this district. It is as promising as any in the country, judging from the present showing—a vein of good milling ore, averaging 5 ft wide; slate wall. A tunnel is in the vein several hundred ft. It is more than probable that a new mill will be built the coming summer to replace the one burned last summer.

MOUNT JEFFERSON.—This mine is near the town of Groveland, and is fitted up with a 10-stamp mill, steam power and having all the latest improvements for the reduction and saving of water. Also classification work being done on a small scale. The sulphurets carry 90% of the yield of gold per ton of the ore, and is consequently classed more particularly a sulphureted mine. The vein is found to widen out as the works are carried down, and at the lowest point reached, the 250 level, it swells out to something like 20 ft or more. The works of late have lain idle, but the machinery, etc., is being refitted, and the mill will be started up within a few days and a force of hands placed in the mine.

TRINITY.

RED HILL.—*Independent*, June 26: In company with E. P. Dany, Esq., we took a trip to Red Hill last Monday, and noted many changes made in the several years since we visited that section last. While it is one of the best mining regions on the coast, the limited supply of water keeps it back and prevents much mining which would otherwise be done in the district at an immense profit. The claims now being worked—all for which any water at all can be obtained—are paying largely, and the present season bids fair to prove a most profitable one for the owners.

NOTE.—Water is plenty; miners continue to sluice and are happy. Cold dust is coming in slowly, the bulk being reserved for the grand, final clean-up a month or so later.

NEVADA.

WASHOE DISTRICT.
BECKER.—*Old Hill News*, June 30: The north drift on the 3000 level has been advanced 20 ft during the week, making its total length 103 ft from the incline. The face is in very hard ground. The south drift, on the same level, is now in 44 ft from the incline. The face shows porphyry and some quartz, and one for the owners.

HALE & NORCROSS.—During the past week the incline has been sunk and timbered 22 ft; total depth, 301 ft below the 2200 level. The hoisting engine has been repaired and work is progressing as usual. Ninety-eight tons of ore have been hoisted from the 2100 level. Average crop samples, \$46.30.

MEXICAN.—On the 1000 level the joint Ophir east crosscut has been extended 28 ft. On the 2300 level are still enlarging and timbering the north drift. On the 2500 level the joint Ophir upraise is being enlarged to the size of the winze. The joint east Ophir crosscut on this level has been extended 30 ft, and the north drift 61 ft.

OPHIR.—On the 1600 level the joint Mexican east crosscut has been extended 40 ft. On the 2500 level the joint Mexican upraise is being enlarged to the size of the winze. The north drift on this level has been advanced 33 ft, and the joint Mexican crosscut on the same level has been extended 42 ft.

UNION SHAFT.—The 2500 station will be completed this week, and a drift will at once be started from this point for the Sierra Nevada incline. As soon as the pumps are working to the 2500 level, the Sierra Nevada incline will be drained and a drift will be started to meet the one from the Union shaft, 2500 station.

SAVAGE.—The main incline during the past week has been repaired and retimbered 31 ft, making 131 ft above the 1000 level.

UNION CON.—No. 2 winze on the 2400 level is making only 1½ ft per day. The ground is very hard and there is a strong flow of hot water. The winze is being timbered closely. The northwest drift on the 2400 level has been extended 50 ft. The south drift on the same level has been extended 17 ft.

SIERRA NEVADA.—As soon as the Union pumps are working to the 2500 level the incline will be drained and a drift will be started to connect with the one coming from the Union shaft 2500 station. The north drift on the 2400 level is out 912 ft and is still in encouraging vein material.

CALIFORNIA.—During last week 477 tons of ore were extracted and sent to the mills from the stopes on the 1600 level. The assay value of this ore was \$37.51. There is no diminution in the ore product. The north drift on the 2300 level has been extended 15 ft.

CHOLLAS.—On the 2400 level the south drift is being cleaned out and it is expected that the diamond drift will be started to-morrow. There is so great a flow of water that the drift cannot be advanced. Prospecting is therefore confined to diamond drift operations.

AURORA DISTRICT.

PROSPECTS.—*Esmeralda Herald*, June 26: This property has been secured by Cov. Blasdel. Work for the past week has been in advancing the tunnel crosscutting the ledge. Eight ft has been accomplished, making the entire distance 90 ft—all the way through ledge maker. A shaft is also being sunk, and is now down a distance of about 80 ft. The ore in the tunnel shows considerable gold, and in places can be seen plainly with the naked eye.

ESMERALDA.—Work was commenced on this well-known mine last Tuesday. The first blast that was put into the ledge threw out a mass of almost solid ore, estimated to run high up in the hundreds. The object of the work now being done is to show what the mine really is. **REAL D. MINE.**—About 20 ft has been accomplished during the week. The formation is considerable less broken, which is a good indication. About the middle of next week the work of putting in a plunger pump at the 650 station will be commenced.

CAMBRIDGE.—This property is situated about 3 miles north of the town of Cambridge. The ledge is about 4 ft wide, carrying good ore the entire depth of the shaft, which is now down about 100 ft. One thousand tons will soon be crushed as a test. It is thought the result will be about \$25 per ton.

THANSGIVING.—The south drift in the ledge has been extended 20 ft during the week in excellent ore, each shift of two men taking out an average of 4½ tons. The rock improves in quality as they go south.

GRAND TUNNEL.—The mass was extended during the week 13 ft, where they encountered 4½ ft of ore of excellent quality, and the whole face is still in ore.

COLUMBIA DISTRICT.

MOUNT DIABLO.—*True Press*, June 26: The main shaft has now reached a depth of 320 ft, and is making good progress for the fourth level, which will be reached about the first of next month, when a depth of 343 ft will have been attained. The sinking distance aggregates 3 ft per day. The east drift from the third level has reached a distance of 90 ft, and is now in a heavy body of clay on the west wall. The east drift on the second level is now

advanced 238 ft. There is still a distance of 25 ft to run to connect with the old works. This drift will connect with the ore bodies which the company opened up last fall. At this point the ore body will average 6 ft in width, and has been exposed eastward 120 ft.

SARATOGA.—The incline is now down 71 ft; from here a drift has been run 100 ft northwest, all of that distance in ledge material. This mine is looked on as one of the good properties of this district, assays from the surface reaching as high as \$84.

EAST MOUNTAIN BOY.—This mine has not been opened to any great extent yet, but during the week a ledge of \$71 ore, averaging 18 inches in thickness, was struck.

MOUNT FORT.—Ore is still being shipped to Belleville and the supply is kept fully up in the dump at the mine. The character of the ore is still of the same rich quality as noted heretofore.

LUCKY HILL.—The incline is still being pushed down as fast as possible and has reached a depth of 130 ft. The incline is now in plastic clay.

SILVER REEF.—Work is still progressing, and the find of last week bids fair to develop something of value. The ore, however, is low grade, assaying only \$40.

JACKSON.—The whim is ready for service, and will be started up to-day. In addition to the chloride now developed an 8-ft vein of ore is developed which assays \$30, \$30, \$41.00.

NORTH NEW ENGLAND.—The shaft is down 10 ft and is still in chloride averaging \$80. Work is still progressing fairly.

CHERRY CREEK DISTRICT.

STAR.—*Cor. White Pine News*, June 22: This mine has a 4-ft ledge of high grade ruby ore on the 650 or lower level, and also some rich chloride ore on the 300 level. A large percentage of the ore milled during the past month has been low grade, and considerable time was lost by the breakage of machinery, but the production of bullion has been fair.

NOTES.—Dr. Brooks is about to erect a 10-stamp mill on his property at Silver canyon, in the Schell Creek range. Assays made from samples brought in from the new discovery in Ruby Hill district, showed its value to be over \$1,000 per ton. Twenty men were put to work on the Teacup mine this week. They Grey Eagle mine is also working a full force of men.

EUREKA DISTRICT.

DEWITT MINE.—*Sentinel*, June 25: Mike Lyons shipped 41,415 lbs of ore to the Eureka Con. from the Dugout mine, which netted him, after paying all expenses, \$3,271.70. This is the first shipment out of 50 tons which has been taken out by 3 men during the past 4 weeks.

HAWKEYE.—Hensley & Stuart are still following the breast of ore which was struck in the Hawkeye several weeks ago, and have now about 40 tons of good ore on the dump.

DEADROCK.—Connection has been made in the Deadrock between the upper and lower tunnels, and a body of high grade ore has been exposed in the lowest workings which assay well up in the hundreds.

NOTE.—There are about 30 tons of high grade ore on the Bald Eagle mine, which will be sent to the Eureka Con. furnaces in a few days for treatment. The recent developments in the Banner are improving, and bid fair to lead to a large body of good ore. Frank Wallace has leased the 300 level of the Connolly mine, and is taking out a large quantity of flux, which is being shipped to the Richmond reduction works.

REMARKS.—*Mining Journal*, June 5: The new ore body in the end of the 200 main west drift, which is now called No. 16 chamber, is opening out very well; as far as explored it shows a length of 50 ft and 15 ft wide, and a height of 25 ft, with ore standing in the top, bottom and end, and it bids well to open out to a large ore body, and it being in new ground it is of great importance.

OSCEOLA.—*Independent*, June 26: The ore body which was found 40 ft above the 500 level, has widened to about 0 ft. The depth is not known of course; the ore has also improved in value.

OSCEOLA DISTRICT.

ONCEBET.—*Cor. White Pine News*, June 20: Operations on this mine have been going on about 10 days with an increased force, which has developed a vein of very rich gold ore. The new strike is a very important one, being much larger and richer than any heretofore discovered.

ITEM.—Quite an excitement prevailed yesterday among our placer miners, by the discovery of a north and south channel, which promises to be very rich in gold.

PHILADELPHIA DISTRICT.

BELMONT.—*Belmont Courier*, June 19: All work at the mine has progressed satisfactorily during the past week. Our drift between 200 and 300 levels was advanced 25 ft through a nice vein of quartz showing some fine ore. This raise from end of west crosscut was advanced 13 ft without any material change. The vein matter and quartz are getting harder, and I am in hopes of soon striking a solid ledge. The raise in north part of mine is showing good ore, vein 2 ft thick. Have advanced the same 23 ft.

BARRELOA.—Have cut through the stringers of quartz and struck solid ground, and when we get through this last we shall cut the back ledge in the north upraise we have advanced 15 ft. We run into a small break in upraise—quartz mixed with porphyry—but the mineral is coming in again. Wall smooth and perfect.

ARIZONA.

GLOBE DISTRICT.—*Silver Belt*, June 10: The Irene mine has a tunnel 330 ft long, at the end of which the ore was struck 250 ft below the surface. Besides the tunnel work, the vein was penetrated from the croppings by a vertical shaft, 57, 135 ft deep, and all in ore. Five assays of the ore ranged from \$58.11 to \$240.32, the average being \$98.

TOMBSTONE DISTRICT.—*Nugget*, June 26: The Grand Central hoisting works are now in active operation, and the material taken from the 3d level. The main shaft is now down 175 ft. At the end of the claim a prospect shaft is down 40 ft, from which there is a drift which will run 175 ft to the main shaft, and so far is all in rich ore. The croppings at the prospect shaft are identical with those at the main shaft, and the cut in that direction from the main shaft shows horn silver to a great extent. At the 3d level, ore is being taken out that assays high, and better. The 5d level they had been running in rich carbonate, but now it shows a fair percentage of gold. The total amount of work underground, so far, is 1,653 ft.

COLORADO.

Narrow Gauge Railroads.

[BY JOHN T. DAVIS.]

Fesling confident that a community is always ready to have laid before them any facts that pertain to the general good, I submit the following facts pertaining to the construction and advantages of a narrow-gauge railroad, and, to make it more conclusive, a short introductory of the rise and progress of the different gauges of railroads may be of advantage in the arguments that have led the commercial world to adopt a system that at first was a matter of supreme ridicule. During the

Early History of Railways in England
A great controversy arose among engineers as to the best gauge to be adopted; but, as all gauges were new and untried, the controversy was mere wordy warfare, and yet of sufficient importance as to engage the attention of such eminent engineers as Brunel and Stephenson, who took opposite sides and divided the profession into two hostile factions, who carried on a newspaper conflict known as the "War of Gauges."

The Brunels advocated the broad gauge with all the scientific force of weight and resistance explained in volumes of calculation; while the Stephenson became the champions of the narrow gauge, with a like amount of facts and figures to substantiate their theory. The Brunels were instrumental in having the seven-ft. gauge built, known as the Great Western, while the Stephenson had the Liverpool and Manchester built, a gauge only four ft. eight and a-half inches, which at that period was known as the narrow gauge. This controversy lasted for 20 years, and was decided at last by that most conclusive of all evidence, "experience." The broad gauge was changed to a standard gauge, and the Stephenson carried off the victory, and established a gauge that has since become the standard in the country where the roads were first introduced and the standard for our own country.

The Gauge Question in this Country.

Although we imitated our neighbors over the way, and tried the experiment of broader gauges than what is known as the standard, they have all proved financial failures, and not one is now left to exercise its influence on the hopes and fears of the unfortunate bondholder, but have all been changed to the standard gauge at a heavy outlay—the York and Erie costing its bondholders the nice little sum of \$8,750,000.

One of the first steps taken by its President, the Hon. H. J. Jewett, Esq., upon taking the Presidency, was to urge upon the English bondholders this outlay of capital before they could possibly expect to realize any interest on their investment. His long experience in railroad matters, coupled with his excellent judgment, was acted upon at once, and we now have the once famous broad gauge on a line with the other paying roads of the country, and with his skill as a railroad manager, the "York and Erie" will, from this time out, begin to pay its interest on its capital stock.

Why the Present Gauge was Adopted.

Stephenson's gauge was the result of accident or unexplained causes, and was occasioned by the putting together of the different parts of the locomotive, and was found to fit a gauge of four ft. eight and one-half inches, instead of four ft. nine inches, as was intended; and no one asked the question until a few years ago, "Why was the present gauge adopted?" The above is an explanation of a system that has become established, and that plays such an important part in the commercial world.

I will now ask the question, "Why has not a narrower gauge been adopted, or why was it not adopted while the controversy was going on as the best gauge for commercial purposes?" As man is somewhat of an progressive creature, his inclination was to make something better than what already existed, yet without stepping too far from the established custom, for fear of the opposition that would naturally spring up from so wide a difference—the country not being educated to the advantages of a gauge still narrower than the one in common use; but as many important improvements are brought to light and use by some circumstance, so it was left, too, for a circumstance to bring about the adoption of a narrower gauge than the one in common use.

The 22-ft. Gauge Railway.

The world-famed and initial narrow gauge of Festiniog, of North Wales, which was originally constructed, in 1832, as a horse tramway to carry slate from the quarries to a shipping point at Portmadoc, was nominally of a two-ft. gauge, although only 23½ inches in fact. This diminutive road was in constant use for over 30 years as a horse tramway, when a change of superintendents induced the owners to substitute a locomotive for the horses, and upon his recommendation two engines were built, weighing about 17 tons; these worked so admirably, and the results were so satisfactory, that it established the value of this mode of operating a railroad, and attracted the attention of Imperial Princes and Royal Commissions from Russia, France, Italy, Spain, Norway and Germany, together with engineers from the U. S. and Brazil, and the uttermost

parts of the earth; thither they flocked, wending their way among the famous Welsh hills to behold, and investigate, and criticize this wonderful miniature iron road that was doing the work of a broad gauge at a fraction of its cost. The novelty (for such was it considered at first) brought weekly visitors, until the manager, Mr. Spooner, wondered whether he was acting in the capacity of superintendent or showman. But this fact was so startling and conclusive that they stimulated the construction of other narrow-gauge roads on the continent, and the effect has been productive of much good to the commercial world.

The Average 3-ft. Gauge.

As a conservative medium has grown out of the many experiments of railroad building, we have adopted as a consistent gauge the three feet, and its growing importance cannot be over-estimated in this country, where railroads must be the forerunner of public improvement; and it has been left for us in the United States to demonstrate that we can penetrate the boundless prairie, or dive into the deep canyons, or climb the rugged mountain-side with our narrow-gauge railroad, and bring civilization and improvement after us, making the desert bloom with the fruit-tree and the valleys teem with golden grain—and this is the result of an experiment tried over 40 years ago among the barren hills of Wales. As it is my purpose to give some facts bearing upon this system, let us consider, first,

The Cost of Construction.

As nearly as facts have demonstrated, the cost of construction is as the width of gauge, except largely in favor of the narrow gauge, where the country is much broken or mountainous; and, taking an average of the cost of construction of several roads that it has been my pleasure of late to examine, we find the percentage of cost so much in favor of the narrow gauge that it remains a mystery why a wider gauge than three feet will be built at all, since the narrow gauge can do all the business the country can furnish. An average of the cost of construction and equipment does not exceed \$15,000 per mile, while the average of the standard and wide gauge is quite or nearly four times as much, or \$60,000. As this amount is a permanent investment, it is no difficult matter to make the comparison in favor of the narrow gauge, since the latter can do all the business the former can do and at a reduction of the cost of operating, besides saving the interest on \$45,000 per annum.

Practical experience has also demonstrated the fact that every inch added to the width of the gauge beyond what is absolutely necessary for the traffic of the road adds to the cost of wear and tear, and fixes a proportionate amount of dead matter to be kept in motion at the expense of increased weight of motive power and consumption of fuel, which entails a necessity of increased tariff and a consequent loss to the capital invested. The dead weight of trains conveying either passengers or merchandise is in direct proportion to the width of gauge adopted. In proof of this take the evidence at hand of any railroad in our country.

Comparative Cost of Operating.

A passenger car of standard gauge weighs, approximately, about 35,000 lbs., with a carrying capacity of 56 persons, making an average of 640 lbs., provided all the seats are occupied; but as that is not the fact on many roads, we assume that the number of passengers will average 35, making 1,000 lbs. of dead weight to each passenger hauled; while on a narrow gauge a passenger car only weighs 15,000 lbs., with a seating capacity of 36, making a dead weight of only about 400 lbs. to the head, and, making the same allowance for absentees, we have 23 passengers, or 15,000 pounds, thus effecting a saving of 40% of the dead weight, which can be utilized in transporting a paying product. And while this difference makes an exhibit largely in favor of a narrow gauge, the freight business is still more conclusive. The cars on the Denver and Rio Grande weigh less than three tons each and carry a paying load of eight to nine tons, being nearly or quite three times their own weight, while on the American standard it never exceeds one to one, and in many cases falls below even this standard. We have, then, the following advantages:

1st. A saving of the cost of construction, ranging from 40% to 75%, owing to the flexibility of the gauge in allowing the road to be built following closely the general contour of the country, and a consequent better gradient with lighter bridging and superstructure, a 30-lb. rail possessing sufficient rigidity to endure the pounding of the wheels of a rail 56 lbs. on a standard gauge.

2d. The less amount of dead weight actually moved in transporting the passengers and freight, amounting to 60%, and the advantage of utilizing this 60% in the transportation of paying commodities.

3d. The utilization of the difference in the quantity of dead weight in overcoming a heavier grade, enabling the road to be run through a more mountainous country without incurring the heavy expense of a wider gauge.

Other Advantages.

If we take an engine of equal power and weight, the gain is a large per cent. in favor of the narrow gauge. As an illustration, an engine with a 35x18-inch cylinder and 36-inch drivers will have a tractive power, on a level grade, equal to 1,460 tons, and will haul 1,064 tons of freight (the engine and cars weighing 400 tons), on a narrow gauge, while the same engine, with

the necessary cars, on a standard gauge, will only haul 900 tons of freight, as the engine and cars, unloaded, make a total of 566 tons, as against 400 on the narrow gauge, which is a loss of the tractive power of the engine of 162 tons, which has to be used as a motive power to transport the additional dead weight of the standard gauge, which, if applied to the transportation of merchandise, would amount to 18%, while the ratio of per cent. saved is greater on heavy grades—as the same engine will haul over an 80-ft. grade only 155 tons, while on a narrow gauge it will haul 182 tons, or about 20%; or take the same load over a grade of 95 ft. to the mile, so that the same steam power on a 3-ft. gauge, being no greater than on a standard gauge, its capacity is from 20% to 25% more, or an effectual saving of 25% in the consumption of fuel.

The Mistaken Idea.

So prevalent among American people, that a narrow-gauge railroad is limited in its capacity, needs but a single reference to convince them of the absurdity of this proposition. The Denver and Rio Grande, which has assumed greater proportions and had larger experience than any other, has not only silenced this clamor, but demonstrated that it is the kind of a road to build through a country that is only developing its resources, for not only has it met the requirements of trade, but has been the means of building up a country that would only have had a puny existence for years to come, and have remained an unproductive grazing country for years; but with its completion and advancement through the barren sand-hills and rugged canyons of Colorado, improvement has followed with rapid stride, and along its line can now be seen the handsome home of the farmer, with droves of cattle upon its thousand hills, bespeaking a life and prosperity that owes its happy and beneficial existence to the construction of that narrow-gauge railroad. And many special items could be cited of astonishing improvements brought about by the construction of this Denver and Rio Grande railroad, were it necessary; but the rapid development of that country, which owes so much to the construction of this road, is a part of the developed history of the country, and it remains for us to be benefited by the improvements of our neighbors.

The Narrow-gauge Roads of California and Nevada

Have been very successful, financially, and no one calls into question the fact that they have been the means of rapidly advancing the general prosperity of the country through which they pass; and such is the cheapness with which they can be built, and the small expense with which they can be operated, that every valley throughout the State will support one, and pay a handsome interest on the investment. The susceptibility with which they can be constructed and maintained in the most circuitous route renders it practicable to reach any mining camp of any note in the country, and long ere the mines have become exhausted, the whole line will be one continuous system of farms and vineyards, that will increase the percentage of profit on the investment.

Millions of capital are now seeking investment in some substantial enterprise, and no other presents so remunerative a field as the judicious construction of a system of narrow-gauge railroads, and no country in the world has such a diversity of interest commanding consideration; and the natural advantages of California, with its lovely climate, alluvial valleys, productive hillsides, and vast and inexhaustible mineral wealth—the latter only beginning to be understood and appreciated, and, like the narrow-gauge system of railroads, much has been learned of late that throws over the future of this business a halo of luster that sparkle far in the future.

In my negotiations with Eastern capitalists the past winter I was happily disappointed to find the prejudice that had heretofore existed against narrow-gauge railroads entirely gone, and they were quite willing to take the bonds of any well-located road with a fair amount of subscription applicable to the superstructure, and at a rate of interest that a few years ago would not have been entertained at all; but now, when Governments only hearing 4½% per annum cannot be had without paying two years' interest in advance, other enterprises having established merit, or even a promising future, find a ready support, with even a risk possible. As a people, we are rapidly growing rich, and the accumulation of capital is so rapid that the undeveloped resources of our country are only waiting the progressive spirit to lay them before the public or shape them into tangible form, and the means can be secured to build them into a permanent interest-paying and commercial enterprise, and a complete system of narrow-gauge railroads will certainly accomplish more for the country and the capitalist than most any other kind of public improvement.

Profits of Narrow-Gauge Railroads.

As the cost of the Denver & Rio Grande was \$13,500 per mile, divided as follows, cost of construction, \$9,520; cost of equipment, \$3,791, we take this road as a basis of our calculation to compare the results of building and operating. The interest on the above cost will only be, at 8%, \$1,080 per annum, and for 100 miles, \$108,000, and putting the operating expenses at 30% of the gross revenue of the road, and the wear and tear at 20%, the road would only be required to do a business of \$153,000 per annum to be a paying investment, an amount but little

above a well-regulated stage line, and to particularize:

20 passengers per day, at \$3.....	\$60
100 tons of freight, at \$5.....	500
	\$560

And for 313 days we have—560x313..... \$175,280
Leaving a net surplus over all expenses of... 17,280

It is needless to say that there is scarcely a valley in the State of California or Nevada that would not afford this amount of business, while on the other hand a standard gauge, costing four times as much, must necessarily draw its trade from four times its area of country, or secure some important connection that will give it a line of business that must be transported beyond its termini; and while the latter in many instances may succeed, and do succeed, the former could do the business much more remuneratively, and faster, and advance an enterprise that would develop the resources of the country in a much more rapid manner, while giving us an inter-State communication largely beneficial to our financial interests.

We now have nearly 4,000 miles of narrow-gauge railroads in our country, and the system is growing in popular favor so rapidly that parties seeking investments for their capital are quite willing to listen to the plans for constructing and the resources for sustaining a narrow gauge.

General Remarks.

Some time before the death of the Hon. J. Edgar Thompson, whose reputation as a railroad engineer is world-wide, and well and faithfully earned, in conversing and discussing the systems of railroads, and their future influence upon the general prosperity of the country, remarked that were he now building the branches of the Pennsylvania railroad he would make them 3 ft., instead of 4 ft. 8½ inches, his long experience satisfying him that the excessive amount of dead weight transported daily, at a useless expense of fuel and wear and tear, could and would be obviated by the narrow gauge. And how rapidly has his conservative opinions become the convictions of other distinguished engineers is evinced by the increased construction of so many miles of this gauge.

And after such a high endorsement, from a source that no one will question, it is not surprising that this system should take such strong hold upon the enterprise of our country, and give strength and power to a system of public improvements that will reclaim the "waste places of our country," and by a united assistance become a power in the land, that will make fruitful the valleys and hillsides of our uncultivated millions of acres.

Now that this system is doing so much toward the development of Colorado, and its success so well established, and such abundant evidence of the safety of the investment, let the enterprising citizens of this country take up this factor of public improvement, and an interest will be established that will place the prosperity of the Pacific Slope beyond the influence of sand-lot demagogues or the barings of discontented blatherskites.

The prejudice against narrow-gauge railroads has given way to a sound conversion of the benefits of the narrow-gauge system, and capital stands ready to meet us more than half way in the completion of this system and the permanent development of our country, and that which was started as a local convenience among the hills of North Wales bids fair to become one of the factors of our most permanent and beneficial improvements.

San Francisco, June 21, 1886.

MINING AT LAKE TAHOE.—As famous as Lake

Tahoe is as a delightful summer resort, it is likely to present new attraction to visitors from this coast at least. The Truckee Republican says from present indications it is likely to prove a great mining center. Already there is considerable excitement, and locations of claims are being made at a very lively rate. Some time ago a ledge was discovered about seven miles from McKinney's landing which prospected well, but the discoverers not having ready means to develop it, the matter was kept secret. Last summer considerable prospecting was done on the ledge, and its value proven. Out of one batch of 90 lbs. of rock, a button valued at \$4 was obtained, and the whole vein proved to be very rich. Lately an Eastern company of capitalists have taken hold of the mine and are going to erect machinery on it at once. The section about the mine is full of ledges, and they are being located by prospectors who consider themselves fully assured of a fortune. There is likely to be a flourishing mining camp over there soon. Gold-bearing ledges are known to exist in other places around the lake, and several parties have heretofore found black sand in paying quantities.

GOLD DISCOVERY IN OREGON.—It is reported that there has been a discovery of a rich gold-bearing quartz ledge in the vicinity of Grave (Leland) creek, Douglas county, Oregon, and that nearly 100 ounces of gold were pounded out of a small lot of ore. There has been more or less gold taken from this creek during the past 25 years.

At a meeting of the Virginia and Nevada mining company, held at Norfolk, Virginia, May 25th, it was unanimously agreed to push the Henry tunnel, White Pine, Nevada, through to the full extent of the location, 3,000 ft.

Charcoal Iron.

Charcoal, says the N. Y. *Mining Record*, is the ideal blast furnace fuel. More iron can be made from a ton of it than from any other. In spite of its great bulk more metal can be produced from a cubic foot of furnace room with this than with any other fuel. Its product is the strongest known. It is the only fuel that does not add impurity to the metal made, and the only one that requires no flux on its own account. Finally, to this list of its perfections must be added its monopoly of the mysterious alchemy of chilling, a phenomenon of which the world has taken advantage for a century, but really does not understand even at the present day.

There is a reason for all this train of excellencies, and that reason is necessarily included in the peculiar conditions of charcoal as a form of carbon and its adaption to the artificial conditions of the blast furnace. Charcoal being a fuel of maximum perfection, it is evident that the law of combustion, as a practical, as distinguished from a scientific question, is to be discovered by the study of its promiscuity. Something has been done in this direction. Berkinhino, Church and others have tried to point out the conditions and causes of its superiority, but much remains to be done. The vast economies which are every day reducing the cost of other irons, have not been applied to this, for fear of losing the valuable qualities which alone make the sale of charcoal pig possible at the high ruling prices. If we are to judge by what has been done in other departments of iron production, we ought to be able to advance to a cheaper manufacture of charcoal iron without losing any advantages of quality.

ENILE MINING IN SIBERIA.—The popular idea of the fate of prisoners sentenced to hard labor in the mines of Siberia is a somewhat exaggerated one. It is generally believed that a man condemned to work in the Siberian mines is virtually condemned to death; that when he descends into the mines he says good-bye to the light of heaven forever, being kept underground until he dies; and that living as he thus does, amid unhealthy fumes, death is not long in coming. A correspondent of the *London Times*, having heard these statements before he went to Siberia, appears to have taken some trouble to ascertain whether they are true or not, and, after many inquiries, "common fairness," he writes, "compels me to say that every one denied that there was any foundation for them." "Even," he continues, "the few Poles who spoke so bitterly of the Government did not bring this to their charge; nor did I meet any of the convicts who said as much." On the contrary, the silver mines were, so far as he could learn, worked on the 12, and sometimes even on the 8-hour system; while in the gold mines, which he himself visited, the men worked in summer from 6 in the morning till 7 at night, with intervals of rest for meals. In the coal mines, also, the men only worked for 12 hours a day, and an officer informed the writer that the amount of work allotted to each man per day ought to be got through by an energetic workman in about two hours. On the other hand, it appears that flogging is not infrequently inflicted in a barbarous manner in Siberia. At three stations, but apparently at three stations only—at Kara-Nicolaiievsk and Saghalien—an instrument called the "troichatka," or plait, is used. From 20 to 50 stripes are usually administered, though the number may be made a 100; and the writer adds that "when heavy numbers are inflicted, the punishment must be little short of an execution. Sometimes, in fact, the convicts do not recover from its effects."

A MONTANA MINE.—We learn from the *Salt Lake Tribune*, of June 17th, that the Boulder mine, of Boulder Co., Montana, is owned by J. P. Lawson & Co. of that city. Although it was discovered late in the summer of 1879, nothing was done toward its development until it came into the hands of the present owners, some time in February of this year, when a force of men was put on and three inclines started on the vein. These inclines were sunk to a depth of 50 ft., when they were discontinued and others commenced at intervals along the vein, the object being to ascertain the length of the ore chute, or chimney. Eight of these inclines have now been put down to depths varying from 20 to 65 ft., thereby proving the vein for a distance of 1,200 ft. The pay ore streak will average 8 ft. in thickness, carrying ore which yields from \$20 to \$500 in gold to the ton. The average has been placed at \$40, and we think this will not be found too high an estimate. The mine has now reached that stage of development to warrant the erection of a mill, and a contract was let last week for one of 20 stamps, to be running by the last of July. The motive power will be water, and it is estimated that the cost of milling will not exceed \$2.50 per ton. The outlook before the owners of this valuable property is exceedingly bright, and we are confident the near future will see them amply rewarded for their pluck and energy.

SHAD BREEDING.—Major Ferguson, of the Fish Commission, who shipped 200,000 young shad to California recently, is much encouraged by the result of his work, which is now about to close for the season. Over 12,000,000 shad have been hatched and distributed during the season, and the attention of the Commission will now be devoted to other varieties of fish. It is intended to extend the scope of the Commission by establishing a park for oyster breeding.

USEFUL INFORMATION.

Sand.—Its Origin and Varieties.

Sands are derived originally from the decomposition of the older rocks, either by the action of running waters or by the spontaneous decomposition of the rocks themselves. They are technically distinguished from dust by the fact that they sink at once to the bottom of water without leaving any sensible quantity in suspension. The decomposition of the rocks often gives rise to an agglutinating substance, which accompanies the sand and binds it together; but when acted upon by the waters it soon parts with such heterogeneous particles, and it arrives in a comparatively pure state in the beds of the principal rivers. This purity is lost as the rivers approach their embouchures; for the diminished velocity of the current allows the heavier particles to subside before arriving there. The water then only carries down the light earthy particles and the decaying vegetable matters which may fall into it, thus giving rise to the formation of clay deposits. The constituent parts of sands represent faithfully the rocks whence they are derived. Thus the granite rocks produce a sand the principal ingredients of which are quartz, feldspar and mica; the volcanic rocks are represented by sands in which lava, obsidian, etc., appear; the flat, soft-grained sand arises from the disintegration of the schistose rocks; the calcareous rocks, as might naturally be expected from their soft nature, are those which are least represented in the series, unless in the case of the silicious sands arising from the comminution of the flints, so plentiful in some of the secondary formations.

The partial and secondary revolutions of the globe have given rise to immense formations of sand in places where rivers have long since ceased to flow. The sand extracted therefrom is known under the name of "pit sand," to distinguish it from that borne down by the rivers, called "river sand," and from the "virgin sand," which remains in the places where formed, without in any way suffering the action of water. Pit sand is generally of a sharper and more angular grain than river sand, but in all other respects its composition is identical, excepting that it is occasionally stained by ochers. Practically speaking, clean, sharp, coarse sand is best, and makes the hardest plastering as a general rule, and it is safe to rely on river sand, the coarser the better, within reasonable limits. Lake sand is the same as river sand, and pit sand always makes good work when the sand is clean and coarse.—*From Chamber's Plasterer's Manual.*

THE HEART AS A MACHINE.—The heart is probably the most efficient piece of physical apparatus known. From a purely mechanical point of view it is something like eight times as efficient as the best steam engine. It may be described, mechanically, as little more than a double force pump furnished with two reservoirs and two pipes of outflow; and the main problem of its action is hydro-dynamical. The left ventricle has a capacity of about three ounces; it beats 75 times a minute; and the work done in overcoming the resistance of the circulating system is equivalent to lifting its charge of blood a little short of ten ft. (9.23 ft.). The average weight of the heart is a little under ten ounces (9.39 oz.). The daily work of the left ventricle is, in round numbers, 90 ft.-tons; adding the work of the right ventricle, the work of the entire organ is nearly 125 ft.-tons. The hourly work of the heart is accordingly equivalent to lifting itself 20,000 ft. an hour. An active mountain climber can average 1,000 ft. of ascent an hour, or one-twentieth the work of the heart. The prize Alp engine, "Bavaria," lifted its own weight 2,700 ft. an hour, thus demonstrating only one-eighth the efficiency of the heart. Four elements have to be considered in estimating the heart's work: (1) the statical pressure of the blood column equal to the animal's height, which has to be sustained; (2) the force consumed in overcoming the inertia of the blood-veins; (3) the resistance offered by the capillary vessels; (4) the friction in the heart itself. This, in a state of health, is kept at its minimum by the lubricated serous membrane of the pericardium.—*Scientific American.*

INOCULATING CHICKENS.—M. Pasteur, the French chemist, has presented to the Academy an important contribution to the subject of virulent diseases, with especial reference to the disease commonly called chicken cholera. He has made the important discovery that the germ of this disease can be artificially cultivated in such a manner that its virulence will be greatly lessened. By inoculating chickens with such changed or modified virus, the disease is controlled precisely as the virulence of small-pox is controlled by vaccination. The value of this discovery is manifest. Pasteur finds that the germs of chicken cholera increase with marvelous rapidity in a chicken broth, neutralized by potash and rendered sterile by a temperature of from 230° to 239° F. If the point of a needle be dipped into a virulent broth the prick of the needle will be fatal to chickens, but it produces merely an abscess in Guinea pigs. The virulence may be diminished by retarding the development of the germs, and inoculation does not then become fatal, but it produces a temporary disorder which, like vaccination, serves as a guard against subsequent attacks.

ON THE USE OF PLASTER OF PARIS.—The plaster may be made to "set" very quickly by mixing it in warm water to which a little sulphate of potash has been added. Plaster of Paris casts, soaked in melted paraffine, may be readily cut or turned in a lathe. They may be rendered very hard and tough by soaking them in warm glue until thoroughly saturated, and allowing them to dry. Plaster of Paris mixed with equal parts of pumice stone makes a fine mold for casting fusible metals; the same mixture is useful for encasing articles to be soldered or brazed. Casts of plaster of Paris may be made to imitate fine bronzes by giving them two or three coats of shellac varnish, and dusting on fine breuze powder when the mastic varnish becomes sticky. Rat holes may be effectually stopped with broken glass and plaster of Paris. A good method of mixing plaster of Paris is to sprinkle it into the water, using rather more water than is required; when the plaster settles, pour off the surplus water and stir carefully. Air bubbles are avoided in this way.

CARE OF MILK.—A writer in a recent number of *Nature* says that milk is especially liable to be affected by the atmosphere about it, whenever it rests in open vessels. In the cleanest pantry or larder, it gathers the effluvia of meat, cheese, onions, bread, fruit and such matters; the result being that it is soured and spoiled. In kitchens, nurseries, living and sleeping-rooms, closets, etc., the case is worse. Nature intended that milk should be drunk at once at its source; and it is very likely that exposures and delays impair its power of nutriment. Milk should be kept as much as possible in close vessels.

COLORING MATTER FROM CAMPHOR.—A valuable dye has been produced from camphor by Dr. W. H. Gregg, of Elmira, N. Y. The only color that he has been able to produce, so far, is yellow in a variety of shades, but he hopes to produce scarlet or carmine. The special features of the dye, aside from its novelty, are its brilliancy and the peculiar fastness of its colors. Boiling for hours in a strong soap solution barely turns the shade of cotton treated with the dyes. The colors will remain good even after the fiber has been destroyed.

GOOD HEALTH.

Checking Perspiration.

A Boston merchant, in "lending a hand" on board of one of his ships on a windy day, found himself at the end of an hour and a half pretty well exhausted and perspiring freely. He sat down to rest. The cool wind from the sea was delightful, and, engaging in conversation, time passed faster than he was aware of. In attempting to rise, he found he was unable to do so without assistance. He was taken home and put to bed, where he remained two years; and for a long time afterwards, could only bobble about with the aid of a crutch. Less exposures than this have, in constitutions not so vigorous, resulted in inflammation of the lungs, "pneumonia," ending in death in less than a week, or causing tedious rheumatisms, to be a source of torture for a lifetime. Multitudes of lives would be saved every year, and an incalculable amount of human suffering would be prevented, if parents would begin to explain to their children, at the age of three or four years, the danger which attends cooling off too quickly after exercise, and the importance of not standing still after exercise, or work, or play, or of remaining exposed to a wind, or of sitting at open window or door, or of pulling off any garment, even the hat or bonnet, while in a heat. It should be remembered by all, that a cold never comes without a cause, and that in four times out of five, it is the result of leaving off exercise too suddenly or of remaining still in the wind, or in a cooler atmosphere than that in which the exercise has been taken.

The colder the weather the more need is there, in coming into the house, to keep on all the clothing, except india-rubber or damp shoes, for several minutes afterwards. Very few rooms are heated higher than 65° when the thermometer is within 20° of zero, while the temperature of the body is always at 98°, in health; so that if a man comes into a room which is 30° colder than his body, he will rapidly cool off, too much so often, even if the external clothing is not removed.

It is not necessary that the perspiration be visible; any exercise which excites the circulation beyond what is natural, causes a proportional increase of perspiration, the sudden checking of which induces dangerous diseases and certain death every day.—*Hall's Journal of Health.*

ORANGES AS A REGIMEN.—A vast number of oranges are eaten by the Spaniards, it being, in fact, no uncommon thing for the children of a family to consume ten or a dozen oranges each, before breakfast, gathering them fresh for this purpose from the trees. Such wholesale consumption of what is commonly looked upon as a luxury, appears to have no unwholesome effect upon the system. On the contrary, the testimony of a late eminent physician authorizes the use of fruit ripe, fresh and freely as a trustworthy auxiliary in the treatment of chronic dyspepsia.

LONDON WATER.—In the *Macmillan Magazine*, Mr. Torrens, M. P., in treating of the water supply of London, describes the actual condition of an out-of-doors cistern in a locality near the Seven Dials. "A poor woman who had known better days, at a vigorous age and strong constitution, sickened and died; and the tank which supplied her only beverage was found to contain two inches of mud, the decomposing bodies of 14 rats, a bar of soap, two candles and many dead beetles." Even in the Mansion House itself, as an instance of what occurs in in-door cisterns in the houses of the wealthy, the civic cistern "was found to contain three-quarters of an inch of fungi-scrub at the top, and three-eighths of an inch of mud at the bottom;" while, "in a bottle of water on the Lord Mayor's table could be seen hundreds of nematoid worms." From cisterns thus situated, adds the *Building News*, probably nearly one-third of the inhabitants of London obtain their only stock of drinking water; and when we reflect on the liability of water to absorb germs and ferments without actual contact, and to become putrid under certain conditions in a few hours; when we remember also the untimely fate of the old lady in Mr. Torrens' story, we can hardly escape a shudder.

NERVE GRAFTING.—Dr. J. Gluck, of Bucharest, lately brought before the ninth congress of the German Society of Surgery of Berlin some interesting results of experiments in nerve grafting. He cut out a portion of the sciatic nerve of a fowl, and then removed a similar portion of the same nerve from the leg of a rabbit, and placed this in the leg of the fowl, uniting the two ends by sutures. The nerve united, and the paralysis caused, of course, by the excision of the piece of the nerve, was recovered from. He repeated the experiment, and exhibited the successful results, showing the fowls with full restoration of power. He was led to these experiments by the result of a case of nerve anura. Paralysis of the median had resulted from the extensive destruction of the tissue of the arm by gangrene. Dr. Gluck cut down on the radial nerve and found that part of the nerve was destroyed. He united the two ends by sutures, and the man regained the power of motion which he had entirely lost. Of course, the experiments of nerve grafting in animals, adds the *Lancet*, do not warrant the expectation that a similar result could be obtained in the case of the human subject. It is well known that the union and regeneration of nerves occur with greater facility in the case of the lower animals than in man.

IMPORTANCE OF SANITARY ENGINEERING.—The authorities of one of the largest hospitals in London lately took measures to ventilate all the drains and sewers in connection with their institution. Up to the time these alterations were made, pyæmia and erysipelas had almost driven the medical staff to despair. When the whole of the ventilation was completed, and as soon as the pressure was removed from the traps of the closets and lavatories, no fresh cases were found to occur. For months the hospital wards were free from both erysipelas and pyæmia. Suddenly, however, there was a fresh outbreak of these diseases, but it was noticed that the epidemic was confined to one of the surgical wards built apart from the main building, on the pavilion plan, and having only one story. Close investigation proved that the ventilation pipe in this wing had been stopped up by a careless workman. When this was remedied all traces of the epidemic disappeared.

D. J. SULLIVAN, a prominent builder of Binghamton, died May 22d, of malarial fever contracted at the Insane Asylum building, where he had been making alterations and repairs. Malaria from an old sewer that formerly extended underneath and through the center of the building is thought to have caused sickness of many of the men engaged on the work. Three of them died. How many other public institutions are in the same condition? We fear too many.

HEALTH OF PRIMARY SCHOOL CHILDREN.—A Massachusetts physician says that a healthy child may, perhaps, safely enter the primary school at seven years of age, but if nervous or inclined to talk or be restless in sleep, better wait another year.

LIMESTONE FOR DWELLINGS.—A Texan professor has written a pamphlet to prove that cities built of limestone are the healthiest in the world, and never much visited by malarial diseases, including yellow fever. The limestone is said to absorb carbonic acid arising from animal and vegetable decomposition.

VIGOROUS OLD AGE.—*London Nature* makes special mention of the fact that M. Chevreul, who is now in his 95th year, has begun his course on chemistry, at the Paris Museum of Natural History, with as much apparent zest and energy as when, 50 years ago, he entered on his duties.

DIPHTHERIA.—The benzoate of sodium has of late been so successfully employed in the treatment of diphtheria that physicians of prominence pronounce it almost a specific for that terrible disease.

MORTALITY OF MEN AND WOMEN.—In a report on the statistics of English mortality, Mr. Weldon states that for the last 30 years more women have survived to the high age of 75 to 80 than men. The latter suffer more from diseases of the lungs, heart and kidneys, and the lung diseases have latterly increased in England,

MINING SCIENTIFIC PRESS

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Revolving Level—B. N. Botte, S. F.
Dividend Notice—The German Savings and Loan Society.
Taylor & Brunton, Mining Engineers, Leadville, Col.
Berkeley Gymnasium, John F. Burris, Superintendent.

The Week.

Cool and bracing weather prevailed from the beginning to the end of June; indeed the uniform low temperature of the month was remarkable. It will prove beneficial to the grain that is maturing, and will be no less advantageous to the busy husbandmen in the field. Harvesting is now general, and there is complaint in some sections of the State of a scarcity of labor. Great activity is also showing itself in the orchards, and the product promises to be of excellent quality.

Reports from our multifarious exchanges from every State and Territory on the coast continue to herald unwonted activity in nearly every one of their numerous mining camps. There are reports of new and valuable discoveries, of energetic work, and of frequent sales of mining property. In Arizona the field of operation is extensive and lively, while all through the mining counties of California, and in many of the mining districts of Nevada, there are cheering signs of present and coming prosperity. In this State especially the outlook for a heavy product is highly encouraging.

Since our last issue the Board of Freeholders, elected by the citizens under provisions of the new Constitution to frame a charter for this city, has completed the arduous duty, and the voluminous document has been published in full. It will be submitted to the popular vote at a special election to be held September 8th. No citizen should neglect to give the charter a careful reading.

During the week intelligence has been received from Washington that several new money-order offices have been established in this State, as well as in the adjoining States and Territories; and also that two additional life-saving stations will be immediately constructed and properly fitted at designated points on this coast.

The national holiday, which this year falls on Sunday, will be commemorated on Monday; and in another column we have set forth the preparations for its celebration in this city.

Investing in the Mines of California.

While the attention of Eastern investors is being just now strongly drawn towards Colorado and Arizona, California is not by this class being wholly neglected. There are at the present time a good many wealthy and enterprising non-residents traveling over the State examining for themselves as to the opportunities that may here offer for getting hold of mines, aside from those who are seeking this sort of information through the agency of others. Some of these are men who have made money speculating in railroad and petroleum shares in the East or in mining properties outside of California, and come here now in the belief that our mines will prove the safest in which to embark their means in the long run.

And in this thing they are probably right. California is essentially a gold-producing country, and there can be no question but mining for this metal must, by the more cautious and considerate, be preferred to silver mining, even though the latter may for the time being yield larger profits. The liability of silver to undergo sudden and extreme fluctuations in price introduces into the business of mining for that metal an element of uncertainty that cannot fail to prove highly distasteful to the more wary and prudent investor. The status of silver in the currencies of the world is, to be sure, just at this moment satisfactory enough; but there is no telling when it may suffer such depreciation in value as would operate very injuriously to the business of producing it.

Then, it may be claimed that California offers some advantages for carrying on the business of mining for the precious metals not common to any other country where this industry is extensively prosecuted; our climate is superior; life and property are here well protected. Our mining titles are little involved or exposed to be involved in litigation. Our mining districts are of easy access; are well supplied with wood and water, besides offering much good farming and grazing land. Our ores are for the most part, free and easily treated, while labor is almost everywhere cheap and manageable. In the multiplied forms of mining practical in this State some further advantages may be claimed as likely to arise to the investor, who, through the same, may to some extent be enabled to consult his means or convenience when about to engage in the business.

Again, California seems about entering upon a new era of mineral discovery. On every hand we hear of rich strikes and important finds being made within her borders, some of these occurring in the placers and some in the department of vein mining. While these discoveries have been scattered all along the main gold belt it is noticeable that some of the most promising have occurred in the more northerly counties of the State, which have heretofore been by outside capital almost wholly overlooked. And here it may be pertinent to observe that in these northern counties will be found many good opportunities for making investments, the mines there, second to none in the State, remaining comparatively undeveloped and virgin. The chances for obtaining desirable hydraulic properties are there especially good. On this point we speak advisedly and from personal knowledge. The field is not very broad, being confined mostly to the Trinity and Klamath rivers. But here the conditions are generally good, the gravel being of high grade, water in large supply and easily introduced upon the mines, with no where any trouble as regards outlet, disposition of debris, the occurrence of indurated cement, volcanic cappings, barren material or those other obstacles which so often hinder and sometimes entirely defeat successful hydraulic operations in the older and more central mining counties.

Even so far north as Smith river, in Del Norte county, there are said to be extensive deposits of auriferous gravel on which several hydraulic enterprises could probably be inaugurated without any very large expenditure and with a reasonable prospect of success. On the Klamath river some openings of this kind also present themselves, with as till larger number along the Trinity and its tributaries.

On this latter stream several hydraulic claims have lately been put in shape for active working, the money for this purpose having been furnished mostly by California parties. The house of Watson, La Grange & Gibson, of San Francisco, have within the past year purchased and equipped two properties of this kind on the lower Trinity, both of which are now making satisfactory net earnings. The gravel on one of these, the Taylor Flat claim, turns out at the rate of 65 cents per cubic yard. This, though three times as much as the average yield of the gravel in the older districts of the State, does not much exceed the average of that handled in Trinity county. And yet there are in this county, as above remarked, a number of localities that afford the very best inducements for parties having the requisite means to engage in this branch of mining.

At some of these places, as on Oregon mountain, the mines have been partially opened and are paying well for the amount of water brought upon them. With a moderate expenditure for increasing the water supply, their annual gross revenues, some \$50,000, might be quadrupled. The Dutton creek ground, lying a little further

south on the same mountain, shows under extensive prospectings a deep bank of excellent gravel. Being, however, in the hands of poor men, it has for years lain a dead property, though a very little money, comparatively speaking, would suffice to transform it into an active producer and place it on a paying basis.

Situate further up the river, adjacent to the town of Trinity Center, is a placer district that has yielded as much gold dust as any other of like area in the county. The conditions for prosecuting hydraulic mining are here supremely good. There is timber and water in superabundance, while the material on which to operate is present in endless quantity and seemingly of good grade. The dump is ample, the Trinity here, into which the mines outlet, being a sweeping torrent with a fall of several hundred feet to the mile. And yet there is scarcely anything that can be called hydraulic mining in progress anywhere in this district. A beginning has, it is true, been made in that direction, one of the most stupendous schemes ever designed in California having been set on foot. Thousands of acres of these gold-bearing gravel lands have been aggregated into one estate, and portions of it patented. Water franchises covering the entire flow of the Trinity and its numerous confluent have been secured. Ditches have been surveyed and partially constructed. Houses, shops and roads have been built, tools and stores brought on the ground, and, in short, every preliminary expenditure incurred necessary to the effective prosecution of the great work in hand. And with this much done the whole business has been suffered to rest; not because it threatened to prove profitless nor yet because the projector was unable to carry it on, but simply because he had meantime taken hold of a bigger job—the reclamation of a million acres of land on the Colorado—a job of more magnificent proportions than this mining enterprise on the Trinity, but which cannot like this be postponed without serious detriment to the fortunes of this would-be swamp land reclaimer. And so the completion of this equally beneficent and even more promising undertaking will, very likely, be put off from year to year, unless other parties having less money but more leisure can be found to step in and carry it through, as they might do to their own great advantage; for certainly the scheme would seem to combine all the elements essential to a great success. This estate comprises in fact everything necessary to the construction of two or three first-class hydraulic properties, the auriferous gravel being here measured by the square mile, while the water flow carries for a good portion of the year not less than 60,000 miners' inches. But this rich material lies unworked and this water runs to waste simply because they happen to belong to one of the rich men of San Francisco, who does not feel the need of turning them at once to practical account. And so of other good claims in these outlying counties which remain unimproved and little productive because the owners are either too rich or too poor to do anything with them.

Ore Crushing.—No. 1.

[Written for the Press by J. RICHARDS.]

The processes for extracting gold from mineral stone are divided into two branches—one ("mechanical") relating to pulverizing or crushing the stone, the other ("chemical") relating to the extraction of the gold from the pulp, sand or dust.

These processes, in so far as breaking and crushing the stone, not only for gold, but other minerals, are much the same, and for centuries past have received the attention and efforts of able engineers in all countries where mining is carried on, and it is a reasonable assumption that any general tendency to "types" of machinery traceable through all this country, has a good foundation in the working requirements.

In California the first experiments were extremely crude and far behind what the practice of other countries afforded at the time. The first stamps used were unsuccessful, and Chinese laborers were employed to break the quartz with hammers, stone-breakers not having come into use. The development of machinery was, however, rapid, and, as usual, in this country bold innovations were made, until an efficiency and economy was reached not attained elsewhere in the world. This development has been almost exclusively by experiment and observation, not to any extent by inductive conclusions or the application of what may be called "principles," so that an impression was left, and now exists that such improvements are all matters of accidental discovery and chance.

The result of this is an annual "crop" of quartz-crushing machines invented by all kinds of people. A tailor or shoemaker may conceive that he is as likely to invent a new process as a miner or mechanic.

Such experiments are not necessary or likely to do any good. The principles involved in the operation of stone crushing, qualified by past history of the art, furnish data enough from which to determine the merits and advantages of different methods as they arise.

The processes employed for reducing quartz are:

1. *Percussion*, by blows, represented by gravity stamps,

2. *Pressure*, represented by rollers, whether supported in axes or balanced by "opposite" pressure.

3. *Maceration*, by rubbing action between surfaces.

4. *Disintegration*, by attrition between particles or rapid heating.

These four types of machinery include all now in use or attempted use. From the beginning the whole tendency has been to percussive processes or stamps, and nearly all departures, perhaps all, from this method, have been from a misapprehension of the relations this method bears to others. Some of the conditions may be laid down as follows:

(1.) In stamping machinery the strains are not imparted to the framing, nor connected through moving joints, but are absorbed by the momentum of the stamps and their stems.

(2.) The moving joints, bearings and all parts subjected to abrasive wear are removed from the quartz, and are placed above it, so as to be fully protected and thoroughly accessible.

(3.) All surfaces subjected to wear, including shoes and dies, requires no skill in replacing, are inexpensive and not machine fitted. Shoes and dies, for example, go from the foundry to the mill, no part requiring preparation.

(4.) A stamp mill consisting of a number of independent and duplicate parts, none of which are subjected to dangerous strain, there is but little risk of detention by breakage. If one battery is stopped, others go on, or if one stamp in a battery requires repairs it is soon substituted from inexpensive parts at hand. Especial attention is called to this sub-division and duplication of parts.

(5.) There being no close running bearings nor other conditions that call for special skill, stamp mills can be operated by the cheapest labor, almost any part can be safely "treated with a sledge hammer," the miners favorite implement.

(6.) The machinery being as before said undivided and consisting of duplicated parts, the amount of work and the consumption of power is at control, if the supply of rock is wanting a battery can be stopped and the others go on; this is an important feature.

(7.) The particles of gold do not suffer from attrition or "tearing" as in other processes where a rubbing action takes place, and this tearing or maceration is always present in all machinery where the acting surfaces do not approach each other parallel.

Taking these conditions and comparing with other processes he will have in most cases the converse.

For example (1) moving or sliding joints near to or below the level of the quartz; (2) renewable parts that require machine-fitting, not to mention expensive material such as steel or chilled surfaces with attached parts that require fitting. (3) The machinery not subdivided, all parts depending one upon the other, so that anything broken causes detention. (4) Close running joints that move under pressure. (5) The framing or other parts having to resist the strains of the pressure applied to the quartz, and not vertically to be resisted by earth foundations as in a stamp mill, and inherent in the machinery, so to speak.

In short, the mechanical conditions point unmistakably to the results which experience has in so expensive a way brought about, and there can be no doubt in respect to the future use of percussive processes for reducing hard mineral stone. The "hammer," throughout ages, and for the whole history of mankind has remained the leading implement in comparison with which the lever, roller, wedge screw, and so on, are but insignificant devices. To exert a great force throughout a limited distance (the required conditions in quartz crushing) no mechanical expedient compares to a "hammer," and the stamp mill is but a form and application of this principle.

In respect to crushing or preliminary breaking, we may find the same agreement between principles and experiences.

Twenty or more mines in England with many in Germany and elsewhere on the continent, employ what are called Cornish rollers for breaking, but it is believed no such plant has been erected in Europe or here since the introduction of the American reciprocating stone breakers. The common conclusion is that revolving rollers, acting as they do continuously, with unlimited or extended surface, must far exceed the performance of any machinery with reciprocating action and small surfaces. The fact is different, because not counting first cost, which is three to one in favor of reciprocating machines, the actual performances are more rapid by the latter. This will be understood when it is remembered that the co-efficient of effect in such machines is as the area of the acting surfaces and the speed at which they approach and leave each other. The mistake in respect to rollers comes from confounding their circumferential velocity with the working one, that is, with the velocity at which the surfaces approach and leave each other in the working plane. The acting surfaces are but a narrow line, while the whole surface of the jaws of a reciprocating machine are acting, and their speed in a working plane is greater than that of rollers, so that after all the history of the two processes is but a development of principles that, from the first, admitted of plain inferential conclusions. In a considerable experience the writer has never met with a practical man who did not confound what may be called the working speed of cylinder or crushing rollers with that of their perimeter.

It may be remarked here that this same prin-

ciple holds good in respect to stamps, when the crushing surfaces have a parallel approach, while with rotary machinery the approach is not parallel, except on an imaginary line at the center. In fact a reciprocating stamp bears much the same relation to rotary pulverizing machines that a reciprocating breaking machine does to rollers, and the end of experiment will not doubt be but a verification of what might be learned in a less expensive way.

The disintegrating process is a new one, comparatively, and as the action is concealed by casing and the parts running at a high speed, there is less known of the "nature" of the operation than others that are more easy to investigate. Messrs. Whelpel & Storer, of Boston, Thomas Carr of England, with many others, have attempted the successful application of this principle, in mode of operating, to quartz crushing. On this coast also there has been very thorough experiments made as to economic as well as mechanical results; but so far as the writer knows all pointing to the fact that the attrition of particles one against the other is less than it is between the particles and the metal driving surfaces, causing a rapid wearing away of such parts, while the agitation, so to call it, of the material, must represent a great loss of power. The history of the disintegrating process by rapidly revolving "beaters" or vanes will no doubt fall into its natural place in manufacturing processes, most likely the pulverization of material not silicious or of a nature to cause much abrasion. Such machines have now conquered a permanent and useful place not hitherto supplied, but not in the treatment of hard mineral stone. Time enough has now elapsed to determine this if we take the general history of this process instead of special cases. The action on material, be it what it may, is but one of the conditions that must in this and all other processes: qualify ultimate success. A necessity for rapidly revolving journals near to and on the same plane with the material is a feature that alone might defeat in practical use any advantage arising from a better method of breaking silicious material.

San Francisco, June 7th, 1880.

THE FORESTRY INQUIRY.—We have already mentioned the expected arrival of Prof. C. S. Sargent, forestry expert for the census office, and his associates. Later information from the East gives the plans of the forest examiners with more detail. They will begin by visiting Kansas to study the tree distribution on the eastern edge of the prairie and plain region; then they will go through Colorado, and possibly New Mexico, to examine on the spot the heavy timber in the canyons of the western spurs of the Rocky mountains. The labor completed, they will proceed, via San Francisco, to Victoria, and thence southward through Puget Sound to Portland, Oregon; then south along the western flank of the Cascade mountains to Roseburg, Douglas county, Oregon, where the party will make their headquarters for some time in order to examine the peculiar and little known forest vegetation of that region. Thence south again to the Mt. Shasta country, in northern California, where so many of the peculiar California trees were first discovered by Douglas and Jeffrey. From a botanical point of view the stay at Roseburg and in the neighborhood of Shasta will probably be the most interesting. The party will visit the great forest of Sequoias at the head of the Kern river in the southern Sierras. In Kansas and Colorado Mr. Sargent will be accompanied by Mr. Robert Douglas of Waukegan, and from Salt Lake westward by Dr. George Engelmann of St. Louis and Dr. Parry. The two latter, who are officially connected with the investigation, will pass the next winter in southern California, and return East by way of Arizona and New Mexico in the spring.

In Ophir canyon, near Franktown, Nev., Price's reservoir gave way on the evening of June 27th, and the rushing water carried everything before it. Three miles of flume and one house were destroyed. The railroad bridge was carried away. The tailings at the old Ophir mill were swept away, and the mill that was working them there will close. Happily no lives were lost.

RECENTLY in the Court of Common Pleas in New York, Judge Van Hoesen decided that a seat in a stock exchange was not property—that is to say, it is not property in the sense that would render it subject to levy for ordinary debt.

Letter From the Comstock.—No. 2.

EDITORS PRESS:—There has been little or no change at the North End since my last letter. The magnitude of the work makes progress necessarily slow, as the machinery being put in is of colossal proportions. All this work is not being done for the simple purpose of prospecting. The managers know that they have a mine there, and although they are showing it very slowly they will show it up eventually, and when the time comes Flood will co-operate with Mackay in sending the boom along. There is now no secrecy regarding the operations in Union and Sierra Nevada; any one can go there

A good story is being circulated around among the mining men here regarding the Alexander mine, which Lucky Baldwin recently visited. Charley Goodwin, of the *Enterprise*, visited the property and agreed with the owners to sell it to Sharoe. Goodwin then had a talk with H. M. Yerrington, Supt of the V. & T. R. R., whom he thought would be a good man to broach the subject to Sharon. Yerrington seeing an opening, concluded he would get the credit himself of selling the mine, and so sent Strother, of Virginia City, to take a look at the property. As the owners were anxious to sell it to Sharon through Goodwin, or any man he might authorize, they fought shy of Strother and showed him the poorest places. He went back and reported it a humbug. Sharon declined to

A National Monument.

The coming of the nation's favorite holiday, the Fourth of July, makes it timely to allude briefly to themes fit to call forth the patriotic flow. The year 1880, the country over, gives many promptings to national pride, and it is probable that Independence Day will be celebrated with unusual rejoicings and gratulation. There is a spirit of progress and prosperity abroad in our industries. The depression born of disorganized affairs resulting from the great conflict, seems now to have wholly passed away; and the people now stand with all the glories of the past to urge them on, and the free field of the future before them in which to win their victories in industrial, social and scientific advancement. It is a good time to review in mind the history of the republic, the glorious deeds of the early patriots, the priceless gifts of later heroes, and to picture the growth of this coming generations. If the results of such studies do not kindle the flame of patriotic pride in the heart of an American, such a one must have a soul so dead that no thought of greatness can awaken it.

We have chosen as an illustration appropriate to this time, an ideal sketch of a monument to the memory of Washington. This design is intended by the artist to fitly embody the idea, not alone of the majesty of the character of our country's father, but to typify the growth of the principles which he held as the corner-stones upon which to found a nation. It must be remarked that such a monument as yet exists only in the artist's drawings, but it is put forth to the view of the people as something worthy of their study, in the hope that some future year may see it, or something like it, hewn from enduring marble to remind coming ages of the veneration in which the great founder of the republic is ever to be held in patriotic hearts.

As most readers are aware, there is already a monument to the memory of Washington in progress of construction at the national capital. Of this, it may be briefly said that it was commenced in 1848 by an association incorporated by Congress. After an expenditure of \$230,000, raised by voluntary subscription, the monument came to a standstill for 20 years. Thus for a score of years it stood an unfinished column of 174 ft. in height. By act of Congress, passed in 1876, appropriating the sum of \$200,000, this monument is to be finished, and will form a lofty and imposing plain obelisk, 70 ft. square at the base and 470 ft. high. It is constructed of great blocks of crystal Maryland marble, lined with blue gneiss stone, and while simple and majestic in form, without attempt at ornament, will constitute a mausoleum that will last for ages, erected by the people of the whole country to its greatest citizen on a scale worthy of the nation.

It is the design of the artist whose work we present on this page, to have the imposing plain obelisk which we have described, serve as the central column of the majestic yet richly ornate structure shown in the engraving. It will certainly be more impressive to the average mind to contemplate a structure of this kind, upon which may be carved the history of the country's progress and the ideal embodiments of the principles for which we contend, than to view a bare shaft, which, no matter how much imagination may adorn it, is still but a vast factory chimney and barren of grace and beauty. It may be that some generation which is to come after us, will take this plain shaft which we shall build, and thus develop from it a monument which shall be more worthy of our country's progress in enlightenment and the science of government.

To the future then this design for a national Washington monument is commended in the hope that ere long it will pass from paper to the enduring stone, and stand perhaps a thousand years in memory of the "Father of His Country."

NORTH BLOOMFIELD MINE.—This great grave claim in Nevada county is one of the conspicuous features of California mining. The works of the company were visited lately by a representative of the *Herald*, who has furnished some interesting facts respecting its operations. Over 100 men, nearly all white, are employed, and nearly 4,000 inches of water are used in the daily washing. The gravel is said to be very rich in the present workings, and the property is in a prosperous condition—in fact, it is in bonanza. Preparations were under way for a blast of 24,000 lbs. of Judson powder,



IDEAL SKETCH OF A NATIONAL WASHINGTON MONUMENT.

and see every drift and cross-cut that is in existence. There have been rumors breathed about a diamond drill penetrating a body of ore north of the Sierra Nevada winz. No such drill has been used except to prospect for water. John Mackay is now striving to carry the Comstock on his shoulders, and in September he will lay aside his house and lantern, and go to Paris for a rest of two years. Those who are in a position to know, assert that before leaving he will put things in such a condition that the heirs will stop growling for a spell, and the bulls will feast in the clover fields of the North End. I consider this information pretty accurate.

Mackay has said that he would not quit the Comstock until he could leave it in good shape, and his determination to leave it in September for Paris gives some the hope that he has calculated on being able to open up the North End before that time. You can at least depend upon the fact that he will never leave it in the lurch.

huy. He could have got the mine for \$750,000, and now the property is offered at \$2,000,000, and not a cent less. When Sharon saw Baldwin in San Francisco and learned what a trade he had lost he is said to have made the air thick with rosy allusions to him.

Since my last letter there has been serious talk of a reduction of wages to \$3 above the tunnel level. The *Enterprise* says that the Miners' Union will do nothing about the matter until the capitalists put up low-grade reduction works. Now what assurance have the capitalists that the Miners' Union will agree to reduce wages after these works are erected? Let the miners agree to accept \$3 a day above the tunnel level and the reduction works would be erected in short order. The Union, however, declines to say what it will do, and no one cares to take risks in the proposition, nor will any one until something definite is arrived at.

HARD DRILL.

Exploration of the Big Horn Country.

Gen. Phil Sheridan three years ago made a rapid personal detour through a portion of the unexplored regions watered by the Big Horn river and its tributaries, says the *Pioneer Press* of June 3d, and he was deeply impressed with the necessity and importance of having that country more examined than was possible by the few military escorts that have threaded the passes of the Big Horn mountains. The few white men that have had the opportunity of seeing the lay of the country, are strongly of opinion that it is a land of gold, as well as rich in soil. The Big Horn, the Powder and Tongue rivers all have their sources in the latitude of Milwaukee, and traverse to a region that is several times larger than the State of Pennsylvania, about the geography and general character of which little is known, except the climate is mild, the valleys rich in grasses, and the hills filled with minerals.

Gen. Sheridan, in view of these circumstances, has ordered Lieut. William F. Clark, of the Second cavalry, now stationed at Fort Keogh, to form a party of 15 men, with half a dozen or more Indian scouts all to be mounted and abundantly provisioned, and to proceed on an exploring tour up the Big Horn river. Of course, the route to be pursued and the exact nature of his instructions have not been divulged by Lieut. Clark, but it is understood that the region to be more particularly explored has been mapped out, and will be thoroughly examined and described.

The Indians have heretofore held control of the great divide from which spring the great tributaries of the Yellowstone and the streams that flow southward into the Platte, and even the most adventurous miners have not succeeded in penetrating the Big Horn mountain ranges. But the Indians have of late become less troublesome, the hostile Sioux having sought new hunting grounds, and now is a good time to ascertain what ground there is for the general belief that the hill and valleys abound in the precious metals. It is claimed that "color" has invariably been found in the sands of the streams that issue from the mountains, and wherever "color" is discovered by the cursory observer, it is assumed to indicate that rich mines are not far away.

Col. Henry W. Farrar, of Chicago, who accompanied Gen. Sheridan on the tour from the Union Pacific railroad to the Yellowstone, has been selected as one of the observers that will make up Lieut. Clark's party, and he reached St. Paul, June 3d, on his way to Keogh, from which point the expedition will start in a short time. Col. Farrar will leave St. Paul immediately for Bismarck, where he will probably be able to secure a steamer, as information has reached St. Paul that the Yellowstone has risen three feet recently, and hence, no difficulty will be experienced in making a rapid and pleasant trip from Bismarck to Fort Keogh. Lieut. Clark is eminently capable of performing the important work committed to his charge by Gen. Sheridan. As a soldier he has been tried on more than one occasion, in which he has won distinguished honor, but his ability as a military commander is scarcely less than his capacity as a leader of a scientific expedition, for which his varied intellectual acquirements exactly fit him. The result of his tour of observation and investigation through the wilds of the Big Horn mountains during the coming summer will be watched with unusual interest.

THE WASHOE PLACER MINE.—Word came in yesterday, says the *Territorial Enterprise* of June 23d, from this mine, situated in the foothills of the Sierras to the westward of Washoe lake and to the southward of Slide mountain, that the shaft has attained a depth of 107 ft. The bottom is still in gravel showing some gold, and some water is beginning to come in. The parties concerned in the enterprise have shown regular bull-dog perseverance. A heavy rain at one time caused their shaft to cave from top to bottom when it was 90 ft. in depth. Their last trouble was an iron boulder so big that the full size of the shaft was blasted through it. This brought them to a depth of about 100 ft. The big boulder and the water now coming in causes them to believe that bedrock is not far away. Some 20 years ago a great deal of coarse, smooth gold (regular California lead gold) was taken out of a little ravine that heads in the hill whereon the present shaft is being sunk. The gold in this ravine was undoubtedly an overflow from a large channel in the hill. A great deal of work has been done at various times at running tunnels and sinking inclines and winzes in search of the old channel, but the present owners are the only parties who have shown much industry and courage. It is likely that when they get to the bottom they will find drift diggings—diggings in which all the gold lies on the bedrock and in 3 or 4 feet of gravel just above it.

MINE LITIGATION.—We learn from the *Bodie Free Press* that litigation is talked of between the Jupiter and Bodie mines to quiet title to the ground being worked by the former company, which by many is considered the most valuable in the district. The Bodie claim the ground under an old placer location which they purchased two years ago, and the Jupiter held it under quartz locations of undisputed age. It is stated that papers have already been filed in the United States Circuit Court at San Francisco.

GOLD QUARTZ DISCOVERY.—We are informed by the *Amador Ledger* of June 19th, that a prospector named Thos. Earhart discovered recently in the vicinity of Black gulch, about three miles south of Jackson, a bunch of quartz carrying a large percentage of gold. The quartz is unlike anything met with along the mother lode. It is much darker in color, and heavier than the whitish rock which abounds on the main lead. A glance is enough to convince anyone posted in such matters that the ore is largely composed of iron and other rebellious metals. Probably it could not be worked to advantage by the ordinary mill process, but would have to undergo a thorough roasting, preparatory to crushing. Its richness in gold, however, is beyond dispute. Specks of yellow metal are visible all over the samples of rock which we saw at the store of Ginocchio Brothers. The lowest estimate places its value at \$300 per ton. A small parcel was burned and pounded in a mortar, and yielded at least at that rate. Samples have been left with the assayer of the Zeile mine, but no return has been received as yet. The size of the ore-body cannot be stated at present. Indeed, no regularly defined ledge appears, but the discovery is in the shape of a hunch or pocket. Walls, however, are plainly discernible on the surface, the distance between them being given not less than 30 ft. Since the discovery was made a rush to locate claims has resulted. All the ground north and south for some distance has been taken up. The lead—if lead it should prove—is on a direct line with the Gwin mine, and the opinion is held in some quarters that it is a part of the same gold-bearing vein.

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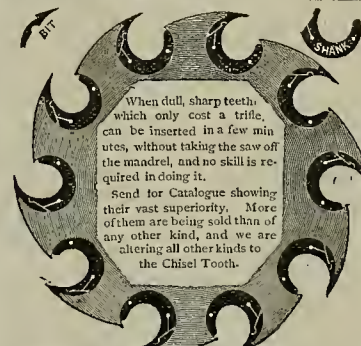
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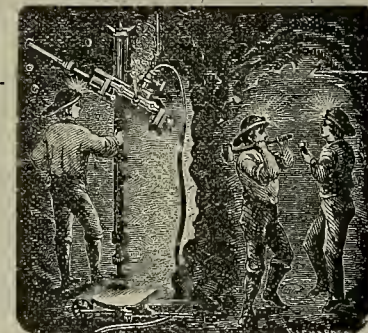
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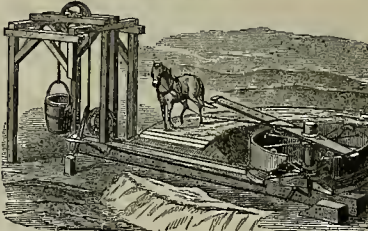
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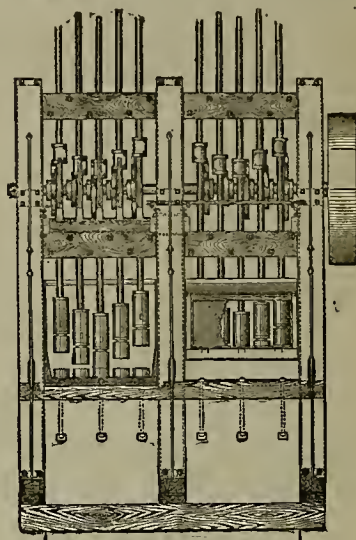
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GOLD AND SILVER Grinding and Amalgamating MACHINERY.

Stamp Mills, Rock Breakers, Crushing Rolls, Amalgamating Pans and Separators for Gold and Silver Ores, Chlorinating Furnaces, Retorts, Rock Drills, Air Compressors, Steel Shoes and Dies for Stamps, and every description of Mine and Mill Supplies.



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Great saving in time and money over the wood frame. Is made complete with wrought-iron frame ready to put upon the foundation, requiring no skilled millwright. These mills are unsurpassed in excellence in every particular.

We are furnishing all the Machinery for a 10-Stamp Gold Mill, including Crucible, Steel Shoes and Dies, Boiler and Engine, Counter Shafing, Pulleys, etc., Stamps weighing 450 lbs. each, with Copper Plate inside of the Mortars, and for tables outside, making all the Machinery complete for a 10-Stamp Mill for the sum of

\$2,550.

We construct Mills with Stamps weighing from 350 to 600 lbs. for gold or Silver Ores. Wet or dry Crushing Mortars. Will contract to erect complete Gold and Silver Mills on the most improved plans. We have 30 years' experience in mining and milling Gold and Silver Ores, and can compete with the world. Send for a circular. Address

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ROBERT GRIMSHAW,

624, 626 and 628 Market Street, Philadelphia

March 10 1880.

A Card from Architects.

The California Architect and Building Review.

Office, No. 240 Montgomery Street, San Francisco, Cal.
It is with pleasure that we publish the following from prominent Architects in this city:

Believing that a journal of its kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, S. H. Williams, Thos. J. Welch, P. Huernie, John Marquis, E. McDougal & Son, Wm. Mooser, Wm. Curlett, Meeker & Banks, W. C. Hoagland, S. & J. Newson, B. Hendrickson.

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The Explorers' and Assayers' Companion,

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Dewey & Co. { 202 San- } Patent Agents

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING JUNE 22, 1886.

229,109.—DRYING APPARATUS.—E. F. Ely, Santa Rosa, Cal.
229,035.—BRECH-LOADING FIREARM.—W. R. Finch, Eureka, Cal.
229,036.—NEWSPAPER FILE.—W. C. Fitch, Sacramento, Cal.
229,040.—GRAFTING TOOL.—C. W. Hoyt, Petaluma, Cal.
229,144.—BOOT AND SHOE.—P. Kelly, S. F.
229,147.—GATE.—F. W. Lamb, Hydeville, Cal.
229,181.—TRACE CLEARER FOR MOWER.—W. Priudle, Santa Clara, Cal.

List of English patents applied for by Pacific Coast inventors:

447.—EXPLOSIVE COMPOUND.—M. Tishner, S. F.
458.—EXTRACTING METALS FROM ORE.—A. C. Tichenor, 685, —UMRELLA.—D. Harris, S. F.
778.—BED.—J. H. Archer, S. F.
1,162.—VALVE.—W. Wilson, Oakland, Cal.
1,216.—PHOTOGRAPHS.—E. S. Molera and J. C. Cebrian, S. F.
1,217.—PHOTOGRAPHS.—E. S. Molera and J. C. Cebrian, S. F.
1,280.—BEER.—A. J. Spencer, San Jose, Cal.
1,583.—CHROMOMETRIC MOTOR.—E. S. Molera and J. C. Cebrian, S. F.
1,620.—VESSEL.—J. S. Taylor, S. F.
1,669.—BOILERS.—E. S. Molera and J. C. Cebrian, S. F.
1,752.—ICE MACHINE.—C. C. Palmer, Oakland, Cal.
1,756.—PIPE LAYING APPARATUS.—E. M. Hamilton and C. N. Earl, Los Angeles, Cal.
2,192.—FIREARM.—A. Schneider and T. Elliott, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

BUTTON.—Elkan Shrier, 201 Montgomery street, San Francisco. This invention relates to certain improvements in that class of buttons in which an independent detachable disk and shank are employed to secure the button to its place, whether it be a sleeve or collar button, or a button of any other form which may be employed upon coats, pants and other articles of wearing apparel. Various devices have been employed to secure the button and disk together, and in some cases the shank has been notched at a point where it enters the button, and the catches by which it is held in place are loosened or released by means of projecting ends of arms which are compressed or forced inward for the purpose. This invention contemplates the employment of a button having a hollow sleeve projecting outward from its center and lower side, and adapted to receive a pointed shank which is rigidly secured to the securing disk. Small holes are made in each of the sides of the shank, and a holding pin or bolt passes through the side of the hollow sleeve at a point where it will just enter one of the holes in the shank, when the latter is forced into place. A spring holds the pin in, and a small head upon the edge, or beneath the button, may be used to retract the pin and release the shank when desired.

BOOT AND SHOE.—P. Kelly, 238 Kearny St., S. F. Patented June 22, 1886. No. 229,144. This invention relates to gaiters of the class in which elastic gores are used to allow the expansion necessary in putting on or taking off the gaiter. Heretofore, as is well known, it has been customary to place straight gores of elastic material in the leg of gaiters, such gores tapering from the top down to the point of termination at the upper edge of the counter or ramp. Such gores have ordinarily been placed on each side of the leg, about midway from front to rear, but have also been placed out of the central line to avoid the ankle-hone, which, when the elastic material is placed on it, is closely pressed, and also exposes said material more to wear. This invention aims to improve the appearance of the gaiter, and to avoid locating the elastic material over the region of the ankle-hone, and at the same time, by means of the curved shape of the gore, to adapt it to the form of the ankle-hone, while preserving the full effect of the elastic material, permitting the leg to expand without wrinkling.

MECHANISM FOR CONVERTING MOTION.—Thomas J. Bell, Grantville, Nye Co., Nevada. Patented June 22, 1886. No. 229,026. This device relates to certain improvements in steam-engines, and consists in providing the pitman or extension of the piston-rod with rack-bars or teeth, which alternately engage with and run from oppositely-placed toothed wheels on shafts provided with gears engaging with a common spur wheel on the driving shaft, so as to convert the reciprocating into a rotary motion without the intervention of cranks, and without having any dead points. It also relates to a certain means of arranging the teeth on the pitman, and combining them with slides carrying braces or lugs for shifting their bearings, and causing them to engage with the gear wheels on either desired side, so that the

motion of the driving shaft may be reversed at will, without the necessity of changing the valve motion.

BRECH-LOADING FIREARM.—Wm. R. Finch, Eureka, Cal. Patented June 22, 1886. No. 229,035. This invention relates to certain improvements in the construction of magazine firearms of that class in which a vertically-running breech-block is operated by a lever and serves as a carrier to transport the cartridge from the magazine to the rear open end of the barrel, into which it is forced by mechanism for the purpose. It consists in a novel construction and combination of a solid breech-block which is moved vertically in the frame at the rear of the barrel with a swinging arm, by which the cartridge is forced into the barrel, so that the breech-block is allowed to move up and close the breech. The whole is operated by a single lever beneath the gun, and the same action cocks the gun and locks the breech-block when closed, so that it cannot be opened.

GRAFTING TOOL.—Charles W. Hoyt, Petaluma, Sonoma Co., Cal. Patented June 22, 1886. No. 229,040. This device consists in the employment of a pair of pivoted handles, one of which is fitted to receive a curved wooden block or bed with an elastic surface, upon which the cutter acts, while the other operating arm moves the cutter which is pivoted to it. The upper end of the cutter is also pivoted to the end of a supplemental arm which extends back and unites with the handle upon the opposite side of the pivot, so as to produce a parallel motion of the cutter, which insures its making a straight clean cut whatever the thickness of the scion or stock to be operated upon.

The Fourth of July in San Francisco.

The arrangements for the celebration of the Fourth in this city are on a grand scale. The preparations being made by the different committees having the matter in charge, augur well for its success. The principal event of the day will of course be the procession, and this year there will be several new features added. During the march there will be a series of *tableau vivants* representing scenes in the country's history, such as the discovery of America, the landing of the Pilgrims, scenes of the Revolutionary wars, etc. Decorated arches will be constructed at the intersection of the main thoroughfares. The one at the corner of Market and Kearny is already assuming magnificent proportions, and when finished will no doubt be a credit to the designer. The Grand Army of the Republic and several other organizations have signified their intention to participate in the celebration. The Executive Committee has decided to have a public display of fire-works on the evening of the fifth, in some portion of the Western Addition. This is the first time in several years that there has been such a display. It is a fitting close to what, we have no doubt, will prove a day to be remembered by all. The Hon. John H. Dickinson is President of the Day, and Col. J. Henley Smith Grand Marshal. The literary exercises will take place at the Grand Opera House, and from the well-known ability of the different citizens who have been selected to carry out the programme a rare treat is promised. The selection of Dr. Shorb as orator is very fortunate, as he is one of San Francisco's best and most polished speakers.

People who desire to get away from the noise and bustle incident to the celebration in this city, will have an opportunity, as there are several excursions advertised to different points of interest. The San Francisco Yacht Club will celebrate the Fourth of July by a trip covering five days. As we go to press the fleet is preparing for a run to Vallejo, under command of Commodore Harrison. The morning of Friday will be spent at Mare Island. In the afternoon the boats will go up to Napa on the flood tide. A ball tendered to the club by the citizens of Napa, at the New Opera House, will occupy the evening. Saturday will be occupied by boat races, social visiting among the yachts and other pastimes, and a concert will be given in the evening. Sunday will be devoted to attendance at divine service, and on Monday morning at eight o'clock the fleet will be arranged in two columns, one under the command of the Commodore, and the other of the Vice-Commodore, and will be towed to Vallejo. There the tugs will drop the yachts, which will then proceed to a contest of speed to the Club House at Sausalito.

Thus it will be seen that the day will be fully honored in this city. This is as it should be, for the day upon which our forefathers sent out that noble document—the Declaration of Independence—to an oppressed people, should forever be green in the hearts of all Americans.

ANOTHER OIL FIRE.—Near the Acme refinery in Olean, N. Y., June 30th, lightning struck a 25,000-barrel oil tank, and set it burning furiously. A force of 100 men was immediately put to work digging trenches for the protection of the surrounding property; and oil and benzine were drawn off from the tanks in the vicinity. Fears were entertained that the fire would spread.

OUR EXPORTS AND IMPORTS.—For the year ending May 31st the exports of the United States exceeded the imports to the extent of more than \$162,000,000, which is a most gratifying exhibit. A few years of such prosperity will make the nation rich.

News in Brief.

A MACHINE for making pies has lately been patented.

ST. LOUIS finds from the census that her population is only 375,000.

It is thought this census will give four more Congressmen to Nebraska.

THE census just taken of Boston shows the population to be about 351,000.

THE annual conference of the Mormons will begin at Salt Lake city July 3d.

THE census of Chicago indicates that the population of that city is about 475,000.

THE work of repairing the old Mission of Carmelo, Monterey, is to be commenced.

RUSSIA is thinking of making the duty on iron so high as to be practically prohibitory.

ROME spends \$200,000 on its public schools, of which 10 years ago it had none at all.

LARGE quantities of wild strawberries are being brought into Olympia, W. T., by Indians.

THE North Palouse river of Washington Territory is capable of furnishing an unlimited water-power for manufacturing purposes.

THE German Bundesrath refused to entertain a petition for the reintroduction of silver currency.

ONCE again the British House of Lords has rejected the bill to legalize marriage with a deceased wife's sister.

ONE of the Indians lately killed in Grant county, New Mexico, had over \$400 in greenbacks on his body.

OF the 599,956,000 acres of land in our Territories, exclusive of Alaska, 489,533,000 have never been surveyed.

THE Duke of Bedford's remissions to his agricultural tenants during the last 18 months amount to over £100,000.

THE deficit in the Postoffice Department for the fiscal year of 1879 was \$3,407,916, which is less than any year since 1866.

THE Supreme Court of Nevada has decided that stock-owners are not responsible for the damage done on unfenced lands.

SHAD are being found in larger quantities near the mouth of the Columbia each year, and will no doubt become a staple article.

THE officials of the Agricultural Department say that the prospects are good this year for a large consumption of American wines.

AT Port Wine, Sissra county, June 2d, the snow was eight ft. deep on a level, and in the ravines and canyons it was much deeper.

AT Arivaca, Arizona, a rattlesnake was recently killed which measured 7½ ft. in length, 13 inches in circumference and had 29 rattles.

A LARGE buck was recently killed on Sonoma mountain. He weighed 700 lbs. when dressed, and his horns have seven points each.

RECENTLY the Russian floating battery *Kremlin* came in collision with a Danish steamer in the Gulf of Finland, and was seriously damaged.

AT this beginning of the present century there were 3,000,000 copies of the Bible in existence; since then 116,000,000 more have been printed.

IT is mentioned that the value of the diamonds exported from the Cape last year amounted to over three and a half millions sterling.

A MAN who firmly believes that a second flood will come next November to cover the whole face of the earth is building an ark at Helena, Texas.

THE accounts of last year's vintage in France are very bad. In the claret district no vintage in this century is remembered to have yielded so little.

A REVENUE posse, in attempting to capture moonshiners near Red Oak, Ga., were resisted. One moonshiner was killed and one mortally wounded.

A HORSE was driven upstairs into a drawing-room at Milton, England, but refused to come down again, and a part of the wall had to be taken out and the horse lowered by a steam crane.

THE steamer *City of New York*, of Alexander's Havana line, caught fire while lying at Brooklyn dock, June 24th, and burned to the water's edge.

AN inventor has patented a car that runs on skates instead of wheels, and is especially intended for elevated railroads. It runs on grooved rails.

A NEW society, "The Fraternity of the Holy Trinity," has been founded by the Spanish Jesuits for the express purpose of opposing the influence of Freemasonry.

A TERRIBLE ACCIDENT.—On Monday, June 28th, a terrible disaster occurred in the East river, by which over 50 passengers lost their lives. The steamboat *Seawanhaka*, which runs from New York city up the Sound to Glen Cove, took fire from an explosion in the engine room, and the center of the boat was soon aflame.

Charles Smith, the pilot, remained at his post until he was burned terribly, and ran the vessel on a sunken meadow adjoining Randall's Island. Passengers sprang overboard, and many were drowned; and others at the stern of the vessel were burned to death. The steamboat burned to the water's edge. No explanation has yet been given of the cause of the explosion in the engine-room which produced the fire. The complaint is general in New York city that the steamboat inspection laws are defective in the first place, and are recklessly violated in the second.

DURING the week ending June 6th, the shipments from the Utah mines amounted to \$104,609, including \$36,145 from the Ontario and \$8,450 from the Leeds.

Bullion Shipments.*

Since our last issue, we have noticed the following bullion shipments:

Paradise, June 25, \$4,189.55; Sierra Nevada, June 24, \$5,180.53; Northern Belle, June 23, \$7,265.07; Con. Virginia, June 26, \$60,056.03; Bodie, June 21, \$7,717; Christy, June 29, \$6,984; Northern Bells, June 29, \$8,019; at Salt Lake City, per Wells, Fargo & Co., June 23, Ontario, \$6,485.35; at Salt Lake City, per McCormick & Co., from Old Telegraph and Brooks, \$6,050; at Salt Lake City, per Union Pacific Express Co., Crimmon Mammoth, \$800, and Barbes & Walker, \$1,569.68; total, \$2,339.63; at Salt Lake City, June 24, per Wells, Fargo & Co., Ontario, \$5,985.11; at Salt Lake City, per Union Pacific Express Co., Christy, \$2,079.61; at Salt Lake City, June 25, per Wells, Fargo & Co., Ontario, \$4,206.10; at Salt Lake City, per Union Pacific Express Co., Barbes & Walker, \$1,534.23; at Salt Lake City, per McCormick & Co., Old Telegraph and Morgan, \$6,500; at Silver Reef, Col., for week ending June 26, per Wells, Fargo & Co., \$29,006.79; Northern Belle, for May, \$104,434; Alexander, for May, \$26,380.70.

*Desiring to make our list of Bullion Shipments as complete as possible, we will be thankful to receive from mining Superintendents and Secretaries notice of all bullion shipments from their respective mines.

NATIONAL BANKS.—The Controller of the Currency has just reported the number of national banks organized during the last fiscal year as 61, with a capital of \$7,352,070. This total number of banks which have gone into voluntary liquidation during the same period is 20, with a capital of \$2,601,000, included among which are three gold banks in California with a capital of \$700,000, which went into voluntary liquidation and organized as currency banks. No national banks failed from July 23, 1879, until June 9, 1880, since which time three banks failed, with a capital of \$700,000, all of which, it is believed, will pay their creditors in full.

OAKLAND HARBOR.—In reference to the long-pending controversy respecting the improvement of Oakland harbor, the Attorney-General decided, June 30th, that as the appropriation is available, the Government can, by virtue of its right to make improvements, use the bed or the streams, or their banks, at a proper distance above low-water mark, for any structure which it may deem appropriate.

MILLS AND METALLURGICAL WORKS.—We would call attention to the advertisement, in another column, of Messrs Taylor & Brunton. This firm is prepared to design, give estimates for and construct every description of mills and metallurgical works for the treatment of gold, silver or copper ores. Their principal office is at Leadville, Col. They have also a branch office at 68 Broadway, New York.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

HALL'S VEGETABLE SICILIAN HAIR RENEVER is a scientific combination of some of the most powerful restorative agents in the vegetable kingdom. It restores gray hair to its original color. It makes the scalp white and clean. It cures dandruff and humors, and falling out of the hair. It furnishes the nutritive principle by which the hair is nourished and supported. It makes the hair moist, soft and glossy, and is unsurpassed as a hair dressing. It is the most economical preparation ever offered to the public, as its effects remain a long time, making only an occasional application necessary. It is recommended and used by eminent medical men, and officially endorsed by the State Assayer of Massachusetts. The popularity of Hall's Hair Renever has increased with the test of many years, both in this country and in foreign lands, and it is now known and used in all the civilized countries of the world.

FOR SALE BY ALL DEALERS.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus and terms of subscription, and request that they circulate the copy sent.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Fishbe, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento valley. His advertisement appears from time to time in this paper.

FRESH attractions are constantly added to Woodward's Gardens, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

Chester Jackson's Best Sweet Navy Tobacco.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Gover Mining and Milling Company.

Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE.—There are delinquent upon the following described stock, an account of assessment (No. 42), levied on the Fifth day of May, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Bracket, Franklin B.	189	100	20 00
Bracket, Franklin B.	190	100	20 00
Bracket, Franklin B.	191	100	20 00
Bracket, Franklin B.	192	75	15 00
Butterfield, Enoch.	193	150	30 00
Barbour, Harry N.	178	100	20 00
Beebe, A. O., Trustee.	297	100	20 00
Beebe, A. O., Trustee.	298	100	20 00
Beebe, A. O., Trustee.	299	100	20 00
Beebe, A. O., Trustee.	300	100	20 00
Beebe, A. O., Trustee.	301	100	20 00
Beebe, A. O., Trustee.	302	100	20 00
Beebe, A. O., Trustee.	303	100	20 00
Beebe, A. O., Trustee.	304	100	20 00
Beebe, A. O., Trustee.	305	100	20 00
Beebe, A. O., Trustee.	306	100	20 00
Beebe, A. O., Trustee.	307	100	20 00
Beebe, A. O., Trustee.	308	100	20 00
Beebe, A. O., Trustee.	309	100	20 00
Beebe, A. O., Trustee.	310	100	20 00
Beebe, A. O., Trustee.	311	100	20 00
Beebe, A. O., Trustee.	312	100	20 00
Beebe, A. O., Trustee.	313	100	20 00
Beebe, A. O., Trustee.	314	100	20 00
Beebe, A. O., Trustee.	315	100	20 00
Beebe, A. O., Trustee.	316	100	20 00
Beebe, A. O., Trustee.	317	100	20 00
Beebe, A. O., Trustee.	318	100	20 00
Beebe, A. O., Trustee.	319	100	20 00
Beebe, A. O., Trustee.	320	100	20 00
Beebe, A. O., Trustee.	321	100	20 00
Beebe, A. O., Trustee.	322	100	20 00
Beebe, A. O., Trustee.	323	100	20 00
Beebe, A. O., Trustee.	324	100	20 00
Beebe, A. O., Trustee.	325	100	20 00
Beebe, A. O., Trustee.	326	100	20 00
Beebe, A. O., Trustee.	327	100	20 00
Beebe, A. O., Trustee.	328	100	20 00
Beebe, A. O., Trustee.	329	110	20 00
Beebe, A. O., Trustee.	330	100	20 00
Beebe, A. O., Trustee.	331	100	20 00
Call, Jonas.	32	2000	400 00
Call, Jonas.	33	1000	200 00
Chapman, C. C., Trustee.	210	500	100 00
Chapman, C. C., Trustee.	211	500	100 00
Chapman, C. C., Trustee.	212	500	100 00
Chapman, C. C., Trustee.	213	500	100 00
Chapman, C. C., Trustee.	214	375	75 00
Day, Wilbur P.	259	50	10 00
Day, Wilbur P.	260	110	22 00
Day, Wilbur P.	261	50	10 00
Day, Wilbur P.	262	50	10 00
Ellis, H. C.	296	250	50 00
Grant, Peter.	336	775	155 00
Goodrich, S. S.	142	50	10 00
Goodrich, S. S.	143	50	10 00
Goodrich, S. S.	144	50	10 00
Goodrich, S. S.	145	50	10 00
Goodrich, S. S.	146	50	10 00
Goodrich, S. S.	147	50	10 00
Goodrich, S. S.	148	50	10 00
Goodrich, S. S.	149	50	10 00
Goodrich, S. S.	150	50	10 00
Goodrich, S. S.	151	50	10 00
Goodrich, S. S.	152	50	10 00
Goodrich, S. S.	153	50	10 00
Hawes, Forest G.	165	100	20 00
Hawes, Forest G.	166	100	20 00
Hawes, Forest G.	167	50	10 00
Jenks, Levi.	31	500	100 00
Jewett, Thomas A.	102	50	10 00
Jewett, Thomas A.	103	50	10 00
Jewett, Thomas A.	104	50	10 00
Jewett, Harriet A.	105	100	20 00
Jewett, Harriet A.	106	100	20 00
Jewett, Harriet A.	107	25	5 00
Jordan, Geo E.	160	100	20 00
Jordan, Geo E.	161	100	20 00
Jordan, Geo E.	162	100	20 00
Jordan, Geo E.	163	100	20 00
Jordan, Geo E.	164	100	20 00
Jordan, Geo E.	165	100	20 00
Jordan, Geo E.	166	150	30 00
Jordan, Geo E.	167	150	30 00
Jewett Arthur.	332	475	95 00
Lewis, Weston, Trustee.	93	250	50 00
Lewis, Weston, Trustee.	94	100	20 00
Lewis, Weston, Trustee.	95	50	10 00
Lewis, Weston, Trustee.	96	50	10 00
Lewis, Weston, Trustee.	97	50	10 00
Macey, S. N.	104	100	20 00
Macey, S. N.	105	500	100 00
Macey, S. N.	106	100	20 00
Macey, S. N.	107	100	20 00
Macey, S. N.	108	200	40 00
Macey, S. N.	109	250	50 00
Macey, S. N.	110	500	100 00
Macey, S. N.	111	500	100 00
Macey, S. N.	112	500	100 00
Macey, S. N.	113	500	100 00
Macey, S. N.	114	300	60 00
Macey, S. N.	115	200	40 00
McAffee, Wm.	200	500	100 00
McAffee, Wm.	201	500	100 00
McAffee, Wm.	202	150	30 00
Norton, Chapman & Co.	344	100	20 00
Norton, Chapman & Co.	345	100	20 00
Norton, Chapman & Co.	346	50	10 00
Norton, Chapman & Co.	347	100	20 00
Norton, Chapman & Co.	348	100	20 00
Norton, Chapman & Co.	349	100	20 00
Norton, Chapman & Co.	350	100	20 00
Norton, Chapman & Co.	351	100	20 00
Norton, Chapman & Co.	352	100	20 00
Norton, Chapman & Co.	353	100	20 00
Norton, Chapman & Co.	354	20	4 00
Plaisted, Nancy M.	147	125	25 00
Preble, Edward E.	225	225	45 00
Stevens, Mrs H A.	77	100	20 00
Stevens, Mrs H A.	78	100	20 00
Stevens, Mrs H A.	79	100	20 00
Stone, W. W.	159	200	40 00
Skinner, Maria.	384	250	50 00
Wood, Ray T.	143	100	20 00
Wood, Ray T.	149	100	20 00
Wood, Ray T.	150	100	20 00
Wood, Ray T.	151	100	20 00
Wood, Ray T.	152	100	20 00
Also 408 shares of the new issue, equal to 2040 shares of the new issue of the capital stock of the said Gover Mining and Milling Company.			

Name	No. of Certificate.	No. of Shares.	No. of Shares.	Amt.
Cook, L. D.	210	10	50	10 00
Cook, L. D.	271	5	25	5 00
Goding, E. L.	254	25	125	25 00
Goding, E. L.	741	13	65	13 00
Grant, Peter.	894	18	90	18 00
Grant, Peter.	916	25	125	25 00

Names.	No. of Certificate.	No. Shares.	Amt.
Grant, Peter.	917	5	25
Goding, E. L.	143	50	250
Goding, Ephraim.	739	29	100
Goding, Mrs E.	740	12	60
Oerrie, Thomas.	682	10	50
Hayes, R. T.	31	10	50
Mitchell, J. L.	150	10	50
Mitchell, J. L.	172	10	50
Mitchell, J. L.	372	5	25
Mitchell, J. L.	405	5	25
Mitchell, J. L.	704	10	50
Rogers, Geo L.	152	29	100
Wallace, Jas H.	395	25	125
Wallace, Jas H.	396	25	125

And in accordance with law and an order of the Board of Directors made on the fifth day of May, 1880, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, room 8, No. 402 Front street, San Francisco, California, on Wednesday, the fourth day of July, 1880, at the hour of one o'clock P. M. of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

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CHAS. H. GOODWIN, Treasurer.
J. P. CHAPMAN, Assistant Treasurer.

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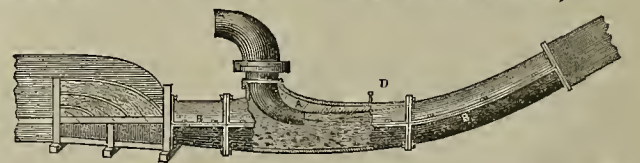
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ult. Also a copy each of your most valuable weeklies,
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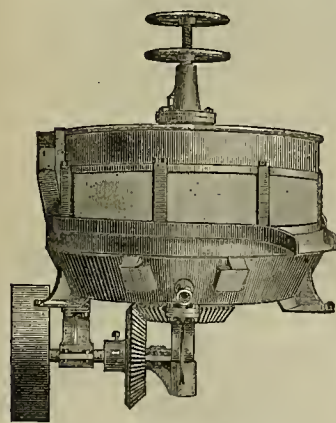
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This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all; and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is simple, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The pan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

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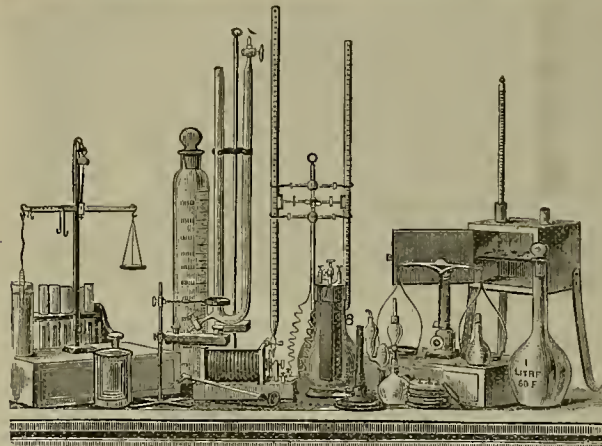
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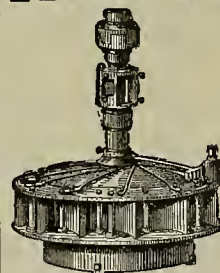
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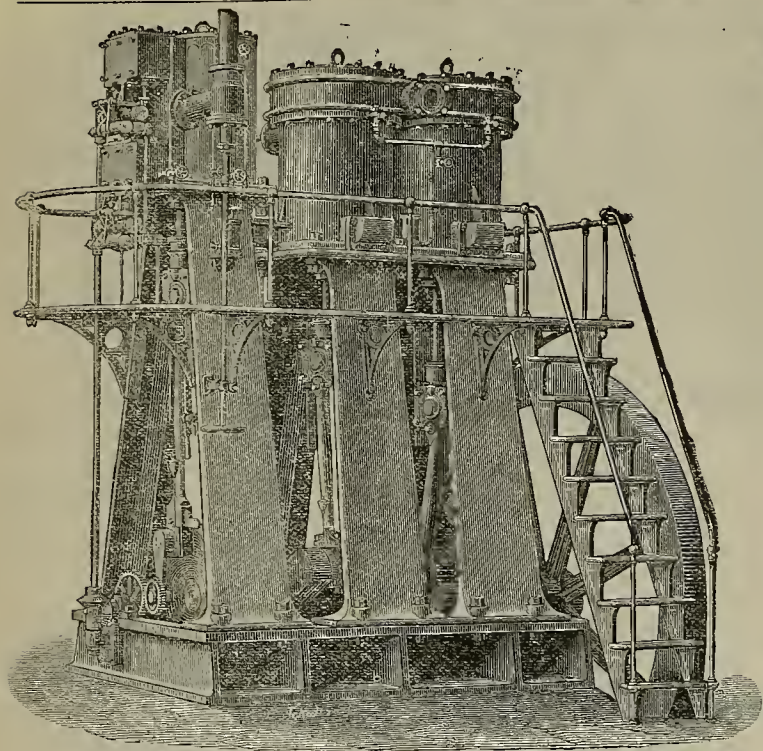
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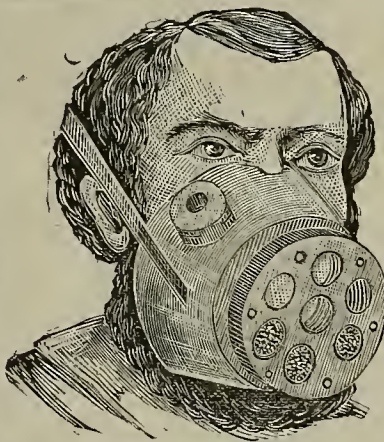
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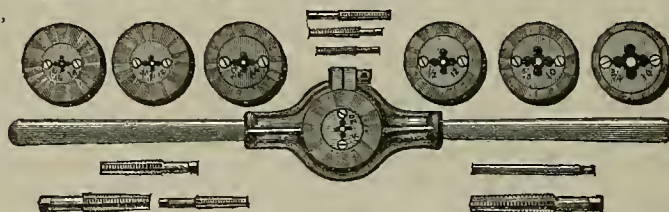
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Yours very truly, CHAS. SLATTERBECK.

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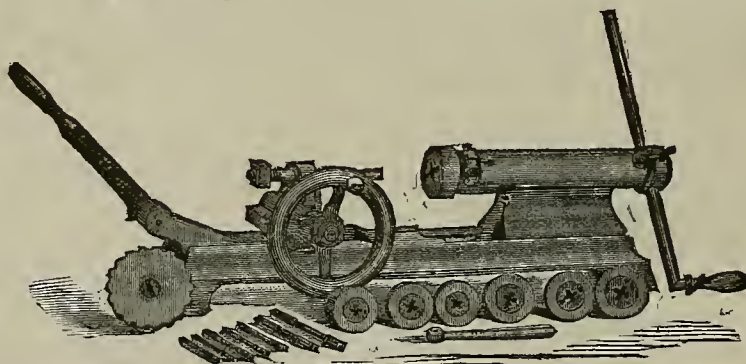
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SAN FRANCISCO, SATURDAY, JULY 10, 1880.

VOLUME XLI
Number 2.

Rich Gold-Bearing Deposit.

The great activity which has prevailed lately in the mining regions of California is not only encouraging but has a substantial practical value. Many a mining camp which has been long abandoned has been aroused into active life by the discoveries made in a distant or an adjoining section; and this again has reacted as the incentive for a renewal of hope and exertion in other mining properties which had apparently exhausted the means and patience and even the hope of the owners. This general renewal of work has already given a new and more enduring tone to the gold-bearing ledges which seam the mountains of California like a network, no less than do the auriferous gravel deposits which lie imbedded in hill and plain. The old activity is bearing some of the old fruit, and there seems to be an assurance that the product of gold in California will largely increase for years. The new and favorable condition of the mining industry has imparted tone to the general business. It has arrested the attention of hitherto indifferent capitalists who are now reported to be buying and inquiring for tangible gold properties. This fact should impel the owners of quartz ledges and gravel deposits to develop them to a point where their value might be ascertained to a reasonable certainty, and where the investor's risk would be reduced to a minimum.

We have been led to make these remarks after reading this account in the Nevada Transcript of the extraordinary discoveries recently made at Snow Point, in Nevada county. It appears that the owners of the property have been earnestly at work in its development for several years. They were both energetic and patient, and they are now likely to reap their well-earned reward. We are not informed of the area of this gravel claim, but we believe it is extensive. There is an occurrence at the mine which is full of interest; and that is the large percentage of black sand which is interspersed through the gravel, and which is reported to carry largely of fine gold. An experiment made with two pounds of this sand, after grinding and amalgamation, gave a yield of \$2.75 in gold. No gold was perceived by the naked eye or with the aid of a glass. The proportion of the black sand is estimated at one ton to the hundred of gravel. Coarse gold prevails in the gravel, and nuggets valued at \$200 were found; and it is said to be an ordinary occurrence for the miners to pick up pieces weighing from 1 to 12 ounces. It is reported that the gravel pays for a depth of 25 ft. above the bedrock. The mine is only partially opened, but the owners assert that it has yielded more gold for the area of ground drifted than any other gravel claim in the State has for many a year. The amount of this rich find is cheering, and it ought to fortify miners with a larger hope for the coming of their lucky strike.

GOOD NEWS.—A dispatch from Dublin, July 6th, conveys the cheering intelligence that the weather all over Ireland, up to the present time, has been most favorable for the crops. It is expected that the crop of potatoes will be enormous; indeed, it gives full promise of exceeding any crop of potatoes seen in Ireland since a period anterior to the blighting famine of 1847. The crops of cereals and of roots generally are also said to be luxuriant. Even the meadows, which alone were backward, have been quickened by generous rains, and give promise of a fine yield.

THE CHANNEL TUNNEL.—It is announced that the preliminary works of the tunnel which is to connect England and France have had the most satisfactory results. The managers have sunk their shaft to the stratum in which they propose to bore the tunnel, and are now about to sink another shaft and lower all the machinery for the bore. It is estimated that in about 18 months they will have bored at least 2½ miles under the channel, and that the work will be completed in four years.

Waugaman's Dry Gold Washer.

This is a late invention which promises to fill a want long felt in certain localities where water cannot be obtained without too great an expense, for purposes of washing or concentration.

This gravel or other material from which it is desirable to separate the gold or other heavy portion, is, if necessary, first screened through a coarse screen, throwing out any pieces larger than about half an inch in diameter. It is then thrown into a hopper which discharges on to a shaking screen having a mesh adapted to the character of the material.

This screen has a slight incline either way from a central apex directly under the hopper, and is provided with a rifle at either end to retain any gold too coarse to pass through it. Its object is to further eliminate gravel too coarse for the succeeding treatment, and to distribute the material properly on the upper edge of an inclined apron. This apron is constructed of coarse wire cloth covered with common sheeting, and set in a shallow frame. The frame is traversed with narrow wooden strips which serve as rifles and also to keep the sheeting in position on the wire cloth. This frame or apron rests on cleats and is keyed into the square body of the machine, and though it is readily removed for cleaning, it is kept stationary while the machine is in operation. Beneath the apron is an oscillating hollow so arranged that its flaps can escape only through the porous material of this apron (or through waste valves arranged to regulate the draft and adapt it to different classes of material.)

When ready for operation the hopper valve, which regulates the feed, is opened far enough to pass a proper supply, and the gearing set in motion by hand or other power. All the material which passes through the shaking or grizzly screen is evenly distributed on the upper edge of the apron above the first wooden strip or rifle. The sudden puffs of air from the oscillating hollow, coming through the wire and cotton cloth of the apron from beneath, lift or throw the sand and fine gravel up and permit it to settle back during their intermission. As the apron is inclined, the lighter parts of the stuff rapidly work down to the discharge, while the heavier is retained mostly in the upper rifle, the gusts of wind not being strong enough to throw them over it.

These machines weigh about 150 pounds, can be taken to pieces for packing and will no doubt be found of great value in remote "dry diggings," as they are especially adapted to gravel washing. The above description carefully read in connection with the illustration herewith presented, will give the reader a very good idea of the construction and mode of working the machine. These machines are manufactured and sold under the firm name of C. J. & E. T. Barber, and may be seen in practical operation, daily, at No. 2 Summer street, in this city.

CURIOSITIES OF THE CENSUS.—The census reveals many curious things, which, if collected in a volume, would make entertaining and valuable reading. For example: In Arizona, on a stream called Moencopy, which empties into the Little Colorado northwest from the San Francisco mountains, the census taker found a flourishing settlement of Mormons engaged in farming and stock-raising: they have a woolen mill run by water-power. North of the Moencopy there was found a Navajo Indian who is rich in patriarchal goods—flocks and herds. He has over 15,000 sheep and goats, and more than 500 head of fine horses.

Railroad Building in Mexico.

A writer of notes recently expressed the opinion that the railroad system was destined to be the chief agent in regenerating the republic of Mexico. It would appear that the zeal which the more intelligent and substantial people of that country are manifesting on the subject of railroads, is likely to soon put the soundness of this judgment to the test of experiment. The U. S. Minister to Mexico has just sent a communication to Washington, conveying the intelligence that various projects for the construction of railroads had seriously engaged the attention of Congress and the people, and that this condition of things would be likely to produce a corresponding interest in the United States, whose capitalists would probably be called upon to supply the means to carry out those enterprises. The Mexican people were, until a recent period, decidedly opposed to railroad projects, but it is represented that they now very earnestly favor them. The construction of such roads as are most necessary and feasible will require the expenditure of millions of dollars.

The valuable concession made to Camacho and others in 1874, to construct a broad-gauge railroad and telegraph line from the city of Mexico to Leon, in Guanajuato, was declared forfeited in December, 1876, by the supreme authority of that State. This contract, with enlarged concessions, was transferred by the President to Symon & Co., April 3d, 1880. Previously, however, in November, 1877, W. J. Palmer & Co. had entered into an agreement with the Minister of Public Works to build a network of narrow-gauge roads from the city of Mexico to the Pacific on the one side, and to the frontier of the United States on the other. Consequently, as the subject demanded the approval of the Mexican Congress, its session, which has just closed, has been agitated by the respective claims of these two companies. As a compromise, the question of which shall enjoy the right has been referred by Congress to the decision of the President of the republic. Either of the companies to which the contract may be awarded, would be entitled to a subsidy from the Mexican government, but it goes without saying that the payment of subsidies would be onerous, difficult, and, perhaps, impracticable for many years. The railroad in Mexico means the establishment of law and order, and full protection to property, the promotion of industry and trade, easy and rapid communication and the gradual conversion of isolated, remote and discordant States into homogeneous and friendly neighbors. The steady operation of a system of railroads through the interior and to the frontiers, would doubtless effect such a radical and beneficent change in the condition of Mexico, as to gradually render the subsidies of practical value. But in our judgment the railroad must come first.

MINING MACHINERY FOR MEXICO.—We learn that Messrs. Prescott, Scott & Co., of the Union Iron Works, are manufacturing a 20-stamp quartz mill for a mining company near Carhoca, Mexico. When completed, the machinery will be shipped to Port Libertad, in the Gulf of California, some 27 miles from the point where the mill is to be erected. The estimated cost of the mill, in perfect working condition, is \$60,000.

HONORING WOMAN.—The first woman who has had entire charge of the female department of Pennsylvania's new hospital for the insane, Dr. Alice Bennett, wore a cap and gown at the recent commencement of the University of Pennsylvania, held in the city of Philadelphia, and received the degree of Doctor of Philosophy.

California Copper.

The San Francisco copper mining company have recently received and have now at Lowell's warehouse, on Davis street, 1,072 bars of copper from their mines and reduction works, at Spencer-ville, Nevada county. The copper is of commercial fineness, is put up in Lake Superior shape, about 18 lbs. to the bar. This company has the right to claim the first production of commercial copper on the Pacific coast direct from the ore.

This mine and works of the company are quite extensive, they have now 12,000 tons of ore in process of calcination, with a capacity for producing from 40 to 50 tons of copper per month. The gross product of each ton of ore worked is about \$12.50, with a net profit of about \$8.25. The plant of the company was fully described in our issue of Feb 15, 1879. It is on quite an extensive scale, and after the most approved of modern appliances. In view of the efforts of this company to produce copper in quantity, and the reasonable supposition that the yield of the mine will realize an annual increase for years to come, and probably encourage other mining enterprises in other portions of the State, it is to be hoped that some of our enterprising capitalists will find it a profitable enterprise to put up rolling and other machinery in this city for working up this product into sheet copper, wire, bolts, rivets, etc. There is a large margin for profit between the price of ingot and manufactured copper. Without this advantage the company will have to seek a market abroad for their ingots, which will be returned to us again as manufactured copper, at rates greatly in advance of what it could be manufactured for in this city.

The International Exhibition of 1883.

The act of Congress incorporating an International Commission for holding a World's Fair at New York in 1883, calls for the appointment of two commissioners from each State and one from each Territory—these to be joined to the commissioners named in the act—the entire number to constitute a commission for initiating and conducting the fair. Pursuant to this act the necessary appointments have already been made, and the commission will soon commence active work. The appointments for this coast, so far as we have learned, are as follows:

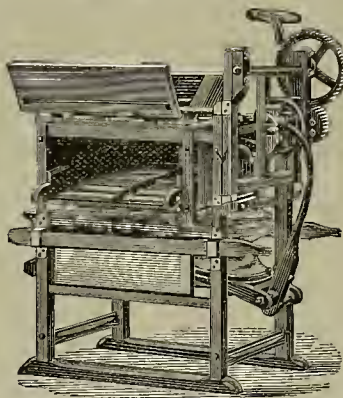
CALIFORNIA.—Henry George and Warren B. Ewer, Commissioners; with Geo. Francis Dawson and Walter Hart as alternates.

NEVADA.—John W. Mackay and M. P. T. Finch, Commissioners; with Richard S. Rising and Allen A. Carter as alternates.

NEW MEXICO.—H. M. Atkinson, Commissioner; with S. H. Newman as alternate.

The first duty of the commission will be to effect a temporary organization and provide for the opening of books of subscription to the capital stock. They will then adjourn, and the subscription books will remain open for 60 days, at the expiration of which time there will be a meeting of the commissioner and stockholders, who will elect a Finance Committee of 25, to superintend that special department. The entire commission will then effect a permanent organization, elect officers, adopt by-laws, appoint committees, etc., when strenuous efforts will be at once commenced to complete the arrangements for the exhibition, and make the same a grand success.

SUFFERINGS OF A RAILROAD CORPS.—Recently from Galveston, Texas, there came a dispatch from Fort Stockton, which says that Major Lawrence and corps, attached to the Texas & Pacific R. R., after a number of days of extreme privation and suffering, arrived at the Pecos river. The party had abandoned both stock and wagons at different intervals along a course of about 40 miles. The members of the party who arrived first at the river went in search of the missing men, many of whom were found crazy from the effects of prolonged thirst, and were entirely stripped of their clothing. They were encountered within 100 yards of the Pecos river, drinking the blood of animals they had killed. The brave conduct of the most experienced members of the corps saved a large number of the men from perishing.



WAUGAMAN'S DRY GOLD WASHER

MECHANICAL PROGRESS.

The Sensitiveness and Isochronism in Governors.

An interesting paper was recently read before the English Society of Mechanical Engineers, on the above subject, from which we extract the following paragraph:

As the attainment of a regular rate of speed is the only object of a governor, it is an interesting inquiry how far this result is achieved by the sensitive and isochronous governors, now frequently applied to steam engines. The irregular manner in which power is communicated from a piston to a crank causes periodical variations in speed, which vary greatly in their degree between such classes of steam engines as the common agricultural type and the high-class mill engine. Whenever there is great sensitiveness in a governor, it is often found that inherent irregularities in speed tend to such an extent that this governor becomes uncertain, runs from one extreme of its range to another, and produces hopeless confusion in the speed of the engine it was intended to regulate—giving, in fact, a worse result than would be produced by a governor of the common type. This evil has been remedied by retarding the movement of sensitive governors, causing their movement to force fluids through small orifices, an unreliable method now superseded by a method invented by the author, whereby the balls overcome the inertia of a mass of metal as they move in or out, a plan applicable to the usual type of governors, and also to those which are direct-acting, fixed upon an engine shaft and altering the stroke of an expansion eccentric. Thus, such governors may be made to effect a more uniform regulation than has hitherto been attainable, and their extreme simplicity remains without attendant disadvantages. An illustration of the relay system was given, where the governor moves a valve admitting hydraulic pressure under a plunger to raise or lower the sluice of a turbine, and so regulate its rate of motion. It was finally shown that governor and engine should correspond in their relations so as to work harmoniously together; and that perfect regularity is unattainable, and can only be approached by providing sufficient inertia in the moving parts to diminish the effect of irregularities in power or resistance until the governor can operate; and that a high rate of revolution attains this condition with the greatest economy and success; and that although the governor may advantageously approach isochronism, its sensitiveness must not be excessive.

NEW STEAM BOILER.—Below is a description of an improved compound steam boiler patented by Mr. Robert R. Hind, of Kohla, Hawaii, Hawaiian Islands. It is designed especially for utilizing cane trash or bagasse, or any other light fuel. These boilers have been largely introduced in the Hawaiian Islands, and have earned a reputation for being very economical steam generators and exceedingly well adapted to any fuel supplying a long flame. The boiler is composed of a single flue or Cornish boiler, and a multitubular boiler, placed end to end, leaving a space between them. These boilers are connected together at the top by a steam drum, and at the bottom by circulating pipes. The Cornish boiler is set directly over the furnace, with the end next to the tubular boiler over the grate, the firing being done at the side. The products of combustion and flame pass backward under this boiler and forward through the single flue, across the space between the two boilers, and through the tubes of the tubular boiler to the chimney. A portion of the heated gas and flame is made to circulate under the latter boiler before passing to the chimney. This boiler is highly spoken of by owners of sugar plantations in the Hawaiian Islands, and it might be profitably employed in saw mills, planing mills, and in manufactories relying on waste and on light fuel for generating steam.

MOTIVE POWERS OF THE FUTURE.—A suggestive paper was recently read before the Liverpool Engineering Society on "The Utilization of the Tides," by Mr. Oates, of Bradford. Mr. Oates was of opinion that although the coal supply of England would last for a long time to come, yet that ultimately the power of the tides would outrival all other sources of mechanical power. After pointing out that the ways of utilizing the tides were innumerable, and describing the construction of the tidal dam with suitable converters of the power, such as turbines in openings of the dam, working air-compressing or magneto-electric machines, he stated that the necessity for large conservators for storing the power between the tides would be the greatest difficulty in utilizing their power. A brief description of how this could be done and the power rendered constant was given. The means of conveying the power to a distance was then considered, air and water pressure and electricity being suggested. With regard to the latter, Mr. Oates believed that the "age of steam" had reached its zenith, and that the "age of electricity" had dawned; but should there be difficulty in conveying the power to a distance, he suggested that manufacturing towns might be built adjacent to suitable sites for utilizing the tides.

The New Steel Processes in the United States.

At the recent meeting of the British Iron and Steel Institute, Mr. Holley being requested by the president to give some account of the steel manufacture in the United States, stated that several works there were preparing to use the basic process; but they had not employed it at all yet or made experiments with it. The opinion of the Bessemer steel makers in the United States was very favorable to the new process. In many parts of the States phosphoric irons were very cheap, and they were going to put this process in useful operation in those parts. The chemical process appeared to be certain, and the American manufacturers thought that there were no great difficulties to be overcome. Perhaps it was proper he should mention that two other processes were, in America, making steel from highly phosphoric iron. They had found a considerable improvement in the open-hearth process by using the Pernot furnace. Several of these were working, but had not been at work long. They, however, gave promise of success; and they believed that in a single Pernot furnace they would be able to produce nearly 100 tons of ingots in 24 hours. It thus appeared that the open hearth would have a large output due to this improved French invention. The Siemens direct process was not much in use; but it was in regular use for manufacturing a very fine steel for boiler plates, which is very extensively used. Nearly every fire-box in America is made of steel. The blooms from which they produced this fine steel is like that of the open hearth. Another process attracting attention in America was the Krupp process, which took out 65% of the phosphorus from pig iron by puddling in a revolving furnace. It is not in use yet, but this result at the Krupp works shows what the American result would be. In regard to the basic process the Americans would not be discouraged about it even if at this outset it did not pay, because they were satisfied that the difficulties were of a mechanical nature and could be overcome.

TO KEEP WAGON TIRES ON THE WHEEL.—A practical mechanic suggests a method of so putting tires on wagons that they will not get loose and require resetting. He says he ironed a wagon some years ago for his own use, and, before putting on the tires, he filled the felloes with linseed oil, and the tires have worn out and were never loose. This method is as follows: He used a long cast-iron heater made for the purpose; the oil is brought to a boiling heat, the wheel is placed on a stick, so as to hang in the oil, each felloe an hour. The timber should be dry, as green timber will not take oil. Care should be taken that the oil is not made hotter than a boiling heat, or the timber will be burned. Timber filled with oil is not susceptible of injury by water, and is rendered much more durable by this process.

WORKING STEEL FOR TOOLS.—In working steel for tools, great care should be taken to hammer all sides alike, for if one side is hammered more than another it will cause it to spring in hardening. Again, steel, when being hammered, should be heated as hot as it will stand, until finishing, and should then be hammered until almost black hot, for the reason that it sets the grain finer, and gives the tool a better edge. The reason for heating the steel so hot while hammering is simply because it makes the steel tougher when hardened, and softer when annealed, while if it were worked at a low red heat, the continued percussive shocks of the hammer would so harden it as to make it almost impossible to anneal it, and at the same time render it brittle when hardened.

EFFECT OF AGE ON THE QUALITY OF IRON.—Prof. Bauschinger, in 1878, tested iron taken from a chain bridge built in 1829, and found that 50 years of use had not perceptibly altered its quality—either its strength or its elasticity—as reported at the time of its erection. He also examined metal from another bridge built in 1852, and found that the average quality remained as given by Von Pauli at the time of its erection. Prof. Thurston, testing pieces of the wire cable of the Fairmount suspension bridge, recently taken down at Philadelphia, after about 40 years' use, found the iron to have a tenacity and elasticity and a ductility fully equal to the best wire of same size found in the market to-day. He therefore concludes that iron subjected to strains such as are met with in properly designed bridges does not deteriorate with age.

BESSEMER steel is now produced of so good a quality, that competent judges assert that ere long it will supersede crucible steel, even in the cutlery manufactories of Sheffield. Already, as it appears, they are making the cheaper grades of cutlery, edge tools, etc., from this product, some 50% to 75% in value of goods produced being accredited to the use of the best quality of Bessemer.

MINERAL-TANNED LEATHER is impervious to water, and is said to be much more durable than leather prepared in the ordinary manner. Tests have been made, which show that helts of mineral-tanned leather are not only 30% cheaper, but are stronger than common belts. The mineral process of tanning is reported to have been introduced into eight tanneries in Germany.

SCIENTIFIC PROGRESS.

An Important Discovery.

A discovery in chemistry has just been published which bids fair to influence agriculture in a manner that may be well described as revolutionary. It must soon compel the attention of farmers and manufacturers of artificial manures everywhere. The essential part which ammonia plays in vegetation need not here be dwelt upon, and no one will question the desirability of securing it cheaply and in quantity. The importance of the recent feat of Messrs. Rickman & Thompson, of England, disclosing a plan by which ammonium sulphate can be made and sold with profit at two cents a pound, will not, therefore, be liable to be over-estimated. The following account of the process is taken from the *Chemical News*.

Within the last 20 years the manufacture of ammonia synthetically has been several times attempted, and though in every attempt it is probable that ammonia has been made, it has never been produced on a commercial scale. In all these attempts the process has been to combine the nitrogen and hydrogen directly at a low temperature, and receive the ammonia in solution in water, or by substitution, first forming a cyanide at a higher heat, and then indirectly producing ammonia by the decomposition of the cyanide, the result in both cases being ammonia in solution with water. Rickman & Thompson's procedure is altogether different, they produce ammonium chloride direct, either in dry powder or in solution, and this by the simplest and most inexpensive means. Instead of employing retorts, as in all other places, they merely use a closed brick furnace, the ash-pan of which regulates the supply of air, and they cause the vapor of water to be produced by this waste heat of the furnace itself. With the exception of about a bushel of coke for starting the furnace, the deoxidizing material and only fuel used is coal-dust. The great difficulty in making ammonia from the nascent hydrogen of water and the nitrogen of the air is the restricted limits of temperature between generation and decomposition, it being necessary that carbon, however used, should be at a full red heat to decompose the vapor of water, and at a bright-red heat to decompose ammonia. Now, ammonium chloride under the same conditions is simply volatilized and not decomposed. As chloride of sodium or of calcium is decomposed at a full red heat in presence of nascent ammonia, therefore one of these chlorides is mixed with the coal that ammonium chloride may be formed; so that if by chance the heat should be raised to a bright red, no loss will be sustained—the ammonium chloride is simply volatilized. By these means a greater range of working temperature is obtained. At the present time, with the consumption of from 20 to 25 lbs. of coal-dust and salt mixed, from two or three lbs. of ammonium chloride is formed.

PROGRESS IN UTILIZATION OF SOLAR HEAT.—Since May last year, M. Mouchot has been carrying on experiments near Algiers with his solar receivers. The smaller mirrors (0.80 m.) diameter have been used successfully for various operations in glass, not requiring more than 400° to 500°. Among these are the fusion and calcination of alum, preparation of benzoic acid, purification of linseed oil, concentration of syrups, sublimation of sulphur, distillation of sulphuric acid, and carbonization of wood in closed vessels. The large solar receiver (with mirror of 3.80 m.) has been improved by addition of a sufficient vapor chamber and of an interior arrangement which keeps the liquid to be vaporized constantly in contact with the whole surface of heating. This apparatus on November 18th, last year, raised 35 liters of cold water to the boiling point in 80 minutes, and an hour and a half later showed a pressure of eight atmospheres. On December 24th M. Mouchot with it distilled directly 25 liters of wine in 80 minutes, producing four liters of brandy. Steam distillation was also successfully done, but perhaps the most interesting results are those relating to mechanical utilization of solar heat. Since March the receiver has been working a horizontal engine (without expansion or condensation) at a rate of 120 revolutions a minute, under a constant pressure of 3.5 atmospheres. The disposable work has been utilized in driving a pump which yields six liters a minute at 3.50 m. or 1,200 liters an hour at 1 m., and in throwing a water-jet 12 m. This result, which M. Mouchot says could be easily improved, is obtained in a constant manner from 8 A. M. to 4 P. M., neither strong winds nor passing clouds sensibly affecting it.

SULPHURIC ACID AS A DISINFECTANT.—The *British Medical Journal* reports the publication, by Prof. Gamgee, of a new and convenient mode of using sulphurous acid, the disinfecting qualities of which are universally known. Cold alcohol, the professor asserts, will dissolve 300 times its own volume of the gas; and a fluid possessing such powers of concentration cannot but be as efficient as it is portable and convenient. A few drops of the sulphureted alcohol in the bottom of a trunk will disinfect any clothing that may be put into it; and fungous germs, such as must in casks, etc., may be destroyed by the use of a very small quantity.

Atmospheric Polarization.

The philosophers who, from the time of Arago, have busied themselves with atmospheric polarization, have concluded that the plane of polarization of the light sent from any point of the sky passed through the sun, or was perpendicular to a plane passing through that luminary. M. Becquerel was led to think that this coincidence did not generally exist, so that he undertook the problem of determining exactly the relative positions of the sun and the plane of polarization. After accumulating the results of two years' observations he has come to the conclusion that if we call a plane passing through any point of the sky the eye of the observer, and the center of the sun the *sun's plane*, then there is a variable angle between that plane and the plane of polarization of the light coming from the particular point in the sky looked at, such that the plane of polarization is always below the sun, that is, between it and the horizon. If the point looked at be north or south, and near the horizon, the angle is small in the early morning, reaches a maximum about 9 or 10 A. M., becomes naught at noon, reaches another maximum at 2 or 3 P. M., and becomes naught again at sunset. Toward east or west no exact coincidence of the planes is observed, but there is a minimum about noon. In the morning and evening the angle between the sun's plane and the plane of polarization is tolerably large, as much as 6°; but near the time of coincidence there are perturbations which have prevented M. Becquerel following the movements of the plane of polarization near sunrise and sunset.

All the phenomena observed lead to the conclusion that the plane of polarization is twisted in the positive direction as seen by a person with his head toward the north and his feet toward the south, and that in the region perpendicular to the dipping needle the plane of polarization suffers practically no twist. The author is, therefore, led to the conclusion that this rotation of the plane is due to terrestrial magnetism. Certain investigations, not yet concluded, have enabled him to calculate *a priori* the possible amount of rotation producible by the earth's magnetism when the thickness of air through which the light comes is known.

This thickness has of course not been accurately determined; but by making certain hypotheses he has arrived at the result that the probable theoretical amount of rotation of the plane of polarization due to terrestrial magnetism is of the same order as the observed value. At the same time, the theoretical value is too small to enable him to conclude that terrestrial magnetism is the sole cause of the observed rotation.—H. Becquerel, in *Jour. de Physique*.

Dr. Siemens' Newest Electrical Results.

A paper was read, June 7th, in London, before a crowded meeting of the Society of Telegraph Engineers, by Dr. Siemens upon "Recent Applications of the Dynamo-Electric Current to Metallurgy, Horticulture and the Transmission of Power." In this paper Dr. Siemens said that he was prepared to corroborate a statement which he had made on a previous occasion; affirming the applicability of the dynamo-electric current to hitherto unaccomplished purposes. Among these purposes was the transmission of power, and the accomplishment of large chemical results, such as the decomposition of metallic salts. The electric arc was capable of producing intense heat with a moderate expenditure of energy, and of effecting the fusion of even platinum or steel. Amidst loud applause, Dr. Siemens personally illustrated this by the experiment of melting two quantities of steel in a plumbago crucible, the first being fused within a quarter of an hour, and the second within the short space of eight minutes. Proceeding to describe the effect of the electric arc on horticulture, Dr. Siemens related the result of some experiments he had made in this direction. They went to prove that the electric light was efficacious in ripening fruit, and if this should be confirmed the horticulturist would become independent of solar light in producing a high quality of fruit at all seasons of the year. With regard to the application of the dynamo-electric current to mechanical propulsion, Dr. Siemens gave details of a practical trial which had been made in Berlin of a toy railway on this system, and the success attending this had given rise to the idea of useful applications of the motor on a larger scale.

FORCE EXCITING ELECTRICITY.—Every heat phenomenon, emission as well as absorption, occasions under favorable circumstances an electric current. The current produced by the emission of heat has the opposite direction from that produced by absorption. If only one metal in a galvanic element is active, the electric force is proportional to the algebraic sum of the heat developed by the bodies acting upon each other within the element. If both metals are active the electric force is proportional to the difference of the algebraic heat sums on the one and the other side. The power of polarization in exciting electricity depends neither on the nature of the gas nor of the metal, but mainly on the chemical action springing from electrolysis. The power of two metals in one acid to produce electricity stands in a simple proportion to the heat which the metals in question evolve when they unite with the acid to form salts.—*Rad. Jugosl. Ak.*

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending June 11.	Week Ending June 18.	Week Ending June 25.	Week Ending July 2.
Alpha.	2.40	2.55	54	5
Alta.	2.40	2.55	54	5
Andrus.	2.40	2.55	54	5
Alps.	2.40	2.55	54	5
Argenta.	2.40	2.55	54	5
Atlantic.	2.40	2.55	54	5
Aurora Tunnel.	2.40	2.55	54	5
Baltimore Con.	2.40	2.55	54	5
Belcher.	2.40	2.55	54	5
Belmont.	2.40	2.55	54	5
Best & Belcher.	2.40	2.55	54	5
Bullion.	2.40	2.55	54	5
Bechtel.	2.40	2.55	54	5
Belle Isle.	2.40	2.55	54	5
Bodie.	2.40	2.55	54	5
Benton.	2.40	2.55	54	5
Bulwer.	2.40	2.55	54	5
Boyle.	2.40	2.55	54	5
Black Hawk.	2.40	2.55	54	5
Belvidere.	2.40	2.55	54	5
Booker.	2.40	2.55	54	5
Caladonia.	2.40	2.55	54	5
California.	2.40	2.55	54	5
Challenge.	2.40	2.55	54	5
Chollar.	2.40	2.55	54	5
Confidence.	2.40	2.55	54	5
Con Imperial.	2.40	2.55	54	5
Con Virginia.	2.40	2.55	54	5
Crown Point.	2.40	2.55	54	5
Con Washoe.	2.40	2.55	54	5
Champion.	2.40	2.55	54	5
Concordia.	2.40	2.55	54	5
Dayton.	2.40	2.55	54	5
DeFrees.	2.40	2.55	54	5
Dancy.	2.40	2.55	54	5
Day.	2.40	2.55	54	5
Eureka Con.	2.40	2.55	54	5
Exchequer.	2.40	2.55	54	5
Endowment.	2.40	2.55	54	5
Gen Thomas.	2.40	2.55	54	5
Grand Prize.	2.40	2.55	54	5
Gila.	2.40	2.55	54	5
Golden Chariot.	2.40	2.55	54	5
Golden Terra.	2.40	2.55	54	5
Goodshaw.	2.40	2.55	54	5
Gould & Curry.	2.40	2.55	54	5
Hale & Norcross.	2.40	2.55	54	5
Fairfield.	2.40	2.55	54	5
Highbridge.	2.40	2.55	54	5
Homestake.	2.40	2.55	54	5
Hussey.	2.40	2.55	54	5
Independence.	2.40	2.55	54	5
Jules.	2.40	2.55	54	5
Justice.	2.40	2.55	54	5
Johnson.	2.40	2.55	54	5
Joe Scates.	2.40	2.55	54	5
K. Con.	2.40	2.55	54	5
Kentuck.	2.40	2.55	54	5
Kosuth.	2.40	2.55	54	5
Keystone.	2.40	2.55	54	5
Lady Bryan.	2.40	2.55	54	5
Lady Wash.	2.40	2.55	54	5
Leopard.	2.40	2.55	54	5
Leviathan.	2.40	2.55	54	5
Leeds.	2.40	2.55	54	5
May Belle.	2.40	2.55	54	5
Modoc.	2.40	2.55	54	5
Manhattan.	2.40	2.55	54	5
Martin White.	2.40	2.55	54	5
McClinton.	2.40	2.55	54	5
Meadow Valley.	2.40	2.55	54	5
Mexican.	2.40	2.55	54	5
Mides.	2.40	2.55	54	5
Morning Star.	2.40	2.55	54	5
North Con Virg.	2.40	2.55	54	5
New York.	2.40	2.55	54	5
Northern Belle.	2.40	2.55	54	5
New Coso.	2.40	2.55	54	5
Nevada.	2.40	2.55	54	5
Occidental.	2.40	2.55	54	5
Ophir.	2.40	2.55	54	5
Oriental.	2.40	2.55	54	5
Overman.	2.40	2.55	54	5
Panther.	2.40	2.55	54	5
Phenix.	2.40	2.55	54	5
Phil Sheridan.	2.40	2.55	54	5
Potosi.	2.40	2.55	54	5
Prospect.	2.40	2.55	54	5
Raymond & E.	2.40	2.55	54	5
Richer.	2.40	2.55	54	5
Rock Island.	2.40	2.55	54	5
Rough & Ready.	2.40	2.55	54	5
Savage.	2.40	2.55	54	5
Seg Belcher.	2.40	2.55	54	5
Sierra Nevada.	2.40	2.55	54	5
Silver Hill.	2.40	2.55	54	5
Silver King.	2.40	2.55	54	5
Silver Prize.	2.40	2.55	54	5
Succor.	2.40	2.55	54	5
Summit.	2.40	2.55	54	5
Scorpion.	2.40	2.55	54	5
Solid Silver.	2.40	2.55	54	5
South Bodie.	2.40	2.55	54	5
South Standard.	2.40	2.55	54	5
Star.	2.40	2.55	54	5
St. Louis.	2.40	2.55	54	5
Syndicate.	2.40	2.55	54	5
Tioga Con.	2.40	2.55	54	5
Tioga.	2.40	2.55	54	5
Trojan.	2.40	2.55	54	5
Union Con.	2.40	2.55	54	5
Utah.	2.40	2.55	54	5
Vermont Con.	2.40	2.55	54	5
Wells Fargo.	2.40	2.55	54	5
Woodville.	2.40	2.55	54	5
White Cloud.	2.40	2.55	54	5
Yellow Jacket.	2.40	2.55	54	5

Sales at S. F. Stock Exchange.

Thursday A. M., July 8.	120	Addenda.	1
50 Alpha.	42	50 Black Hawk.	55c
105 Alta.	101	50 Booker.	40c
750 Andrus.	101	50 Bulwer.	51c
210 Best & Belcher.	81	100 Boston.	1.15
500 Belcher.	1.80	250 Bechtel.	1.15
300 Bullion.	1.12	350 Belle Isle.	50c
200 Benton.	1.10	300 Bodie.	30c
2050 Con Imperial.	2.9c	200 Champion.	75c
400 Con Virginia.	3.45	300 O Pacific.	1.15
40 Crown Point.	2.10	300 Dudley.	50c
20 Confidence.	4	500 D Standard.	55c
50 Caladonia.	35c	200 Eureka Con.	1.75
25 Challenge.	1	300 E M Diahlo.	50c
65 Exchequer.	1.10	450 G. Con.	1.30
90 Gould & Curry.	3.20	251 Grand Prize.	2.15
190 Hale & Nor.	31	30 Holmes.	1.30
190 Julia.	45c	150 Metallic.	40c
140 Justice.	20c	150 M Potosi.	40c
40 L. Bryan.	20	100 McCon.	1.15
270 Mexican.	81	70 Mono.	3.90
1100 N Bonanza.	10c	150 Mammoth.	15c
350 New York.	35c	300 M White.	55c
10 Ophir.	71	15 N Nevada.	3.15
350 Overman.	35c	50 Northern Belle.	1.15
130 Occidental.	80c	250 Navajo.	40c
100 Potosi.	2	700 N Belle Is.	40c
240 Quinn.	25	35 N Bonanza.	3.60
685 Savage.	1.01	700 Queen Bee.	70c
330 Sierra Nevada.	12	100 Richer.	10c
60 Silver Hill.	40c	255 Summit.	2.01
230 Scorpion.	1.15	200 Syndicate.	75c
300 Union Con.	1.10	50 Silver King.	3.15
120 Utah.	90c	330 Tuscarora.	1.10
50 Ward.	1.10	200 Tip-top.	8c
230 Yellow Jacket.	55	100 Tioga Con.	1.35
400 Argenta.	40c	100 University.	25c
		25 Wales.	3.20

FIVE steamships landed 1,806 immigrants at Castle Garden, New York, June 30th.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Atlanta M Co	Utah	1	05	Jan 2	June 24	July 19	A F McGrew	420 Montgomery st
Atlas M Co	Utah	1	20	May 19	June 23	July 14	A F McGrew	430 Montgomery st
Bechtel Con M Co	California	5	25	June 12	July 20	Aug 9	W H Lent	309 Montgomery st
Belcher M Co	Nevada	23	50	June 28	Aug 5	Aug 26	Jno H Griffiths	327 Pine st
Belcher & Belcher	Nevada	18	50	July 2	Aug 5	Aug 26	W Willis	309 Montgomery st
Bullion M Co	Nevada	15	100	June 2	July 7	July 27	J M Brazell	328 Montgomery st
Concordia M Co	California	3	15	June 1	July 8	Aug 2	Wm J Taylor	310 Pine st
Defiance G M Co	California	5	25	May 20	June 28	July 21	W H Lent	309 Montgomery st
McCrackin Con M Co	Nevada	3	200	June 22	July 26	Aug 16	Chas N Shaw	403 California st
Hale & Norcross	Nevada	64	50	May 11	June 16	July 8	J F Lightner	309 Montgomery st
Highbridge S M & Co	Nevada	1	30	June 23	July 26	Aug 17	J W Paw	310 Pine st
Ivanpah Con M & M Co	California	2	175	June 19	July 24	Aug 11	E J Friedlander	300 California st
Julia Con M Co	Nevada	12	40	May 12	June 16	July 6	H A Charles	419 California st
Justice M Co	California	9	40	June 14	July 16	Aug 11	E C Masten	18 Nevada Block
Mammoth M Co	Nevada	32	50	May 22	June 26	July 19	R E Kelly	419 California st
McCrackin Con M Co	California	5	50	June 16	July 27	Aug 27	A W Rose, Jr.	302 Montgomery st
Monte Cristo Con M Co	Arizona	5	40	June 26	Aug 4	Sept 30	A Wenzelburger	25 Sansone st
Northern King M & M Co	California	3	10	May 26	July 5	Aug 5	Butler Burris	309 Montgomery st
New York M Co	Nevada	23	15	June 7	July 10	Aug 3	D L Thomas	327 Pine st
Northern Nevada S M Co	Nevada	1	60	June 30	Aug 3	Aug 28	W H Stetson	309 Montgomery st
Occidental Con G M Co	California	4	03	June 14	Aug 5	Aug 25	W T Smith	402 Montgomery st
Ophir S M Co	Nevada	36	100	June 4	July 9	July 29	C L McCoy	309 Montgomery st
Overman S M Co	Nevada	46	50	June 10	July 16	Aug 6	Geo D Edwards	414 California st
Sierra Nevada S M Co	Nevada	45	100	June 23	Aug 3	Aug 23	E B Holmes	309 Montgomery st
Phil Sheridan G & S M Co	Nevada	10	25	June 22	July 24	Aug 14	D L Thomas	327 Pine st
Telfair M Co	Arizona	3	01	June 8	Aug 7	Aug 7	J Pentecost	702 Market st
Tuscarora M & M Co	Nevada	6	15	June 26	Aug 2	Aug 23	M E Sperling	309 California st
University G M Co	California	6	10	June 10	July 6	July 6	Wm Oliver	328 Montgomery st
Wells Fargo M Co	Nevada	14	10	May 26	June 23	July 19	A Colburn	316 Pine st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Argonaut M Co	Arizona	1	03	May 26	July 3	July 24	J Pentecost	702 Market st
Burtin Hydraulic M Co	California	4	100	June 22	July 24	Aug 17	L L Demery	729 Montgomery st
Cumbarland & S M Co	Arizona	1	30	June 8	July 19	Aug 9	Jno H Griffiths	328 Montgomery st
Empire G & S M Co	California	2	10	June 4	July 7	July 26	Jno McGeehan	318 Pine st
Excelsior Deep Gravel M Co	California	11	10	June 16	July 17	Aug 9	D B Chisholm	327 Pine st
Gover M & M Co	California	42	20	May 5	June 21	July 14	W O Wilson	402 Front st
Morgan M Co	California	61	50	May 14	June 21	July 15	E J Friedlander	533 Kearny st
Original Keystone S M Co	Nevada	3	50	May 26	June 29	July 21	F E Luty	310 Pine st
Paris M Co	California	1	10	June 1	July 7	July 30	Wm J Taylor	310 Pine st
Red Hill H M & W Co	California	3	03	June 15	July 17	Aug 2	A B Paul	328 Montgomery st
Rocky Point M Co	California	3	05	May 23	June 28	July 19	T L Thomas	314 Bush st
Savage & Smet Con M Co	California	1	12	June 2	July 24	Aug 12	Chas W Badger	315 California st
Wide Awake D & M Co	Arizona	10	05	May 22	July 1	July 20	C Hildebrandt	232 Sutter st
Wyoming Coal M Co	Wyoming	2	3	April 21	June 10	July 10	Edward Lande	309 Montgomery st
Yuba G M Co	California	10	200	June 19	Aug 2	Aug 14		

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Best & Belcher M Co	Nevada	Wm Willis	309 Montgomery st	Annual	July 12
Betty O'Neal M Co	Nevada	R W Heath	313 Pine st	Annual	July 12
Eagle S M Co	Nevada	J E Byrne	533 Kearny st	Annual	July 5
Lady Bryan	Nevada	C Van Brock Hubbard	310 Pine st	Annual	July 7
Savage M Co	Nevada	E B Holmes	309 Montgomery st	Annual	July 12
Uth S M Co	Nevada	G C Pratt	309 Montgomery st	Annual	July 13
Union Con S M Co	Nevada	J M Huntington	309 California st	Annual	July 19
Yellow Jacket	Nevada	Wm Willis	309 Montgomery st	Annual	July 19

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Black Bear Q M Co	California	W L Oliver	Safe Deposit Bldg	25	May 16
Consolidated Virginia M C	Nevada	A W Havens	309 Montgomery st	50	July 17
Eureka Con M Co	Nevada	A W Traylor	37 Nevada Block	50	July 19
Fairfield Smet Con M Co	California	C Van Brock Hubbard	404 Montgomery st	50	June 30
Idaho G M Co	California	C McAdams	324 Pine st	20	Apr 3
Napa Quicksilver Con M Co	California	Wm W Parrish	330 Pine st	10	June 10
New York Hill M Co	California	J B Leighton	527 Clay st	2	June 25
Natoma Water & M Co	California			200	Apr 5
Northern Belle M Co	Utah	W Willis	309 Montgomery st	50	Apr 15
Ontario M Co	California	Wm Willis	309 Montgomery st	75	July 12
Standard Con M Co	Nevada	E F Stone	306 Pine st	03	May 24
Seventy-six S M Co	Nevada				

The Mining Share Market.

This has been a short and a dull week in the mining share market. After the long adjournment, the Board opened on Wednesday, but transacted very little business. The declaration of a dividend on Con. Virginia shares created a little stir, and caused some demand for the stock, but in other respects the Comstock shares have been quiet. In outside stocks there has been inquiry and sale for Northern Belle; and among the Bodies, Addenda showed some activity. Beyond these meager transactions the share market remained as it has been for a period beyond which the memory of the veteran dealer runneth not to the contrary.

Meanwhile operations of great magnitude continue and grow upon the Comstock. The *Enterprise* remarks that the drift from the bottom of winze No. 1, on the 2500 level of Union Con., which is to connect with the Sierra Nevada, and which can be done with a little work, will show very close to the heel of the ore-body, and may possibly cut into it. The low-grade quartz through which the drift on the 2500 level, between the two winzes, is progressing, is doubtless the east casing of the ore-vein. It is probable that a west crosscut, started at almost any point in this quartz, would soon run into ore.

The reports from the mining regions of this State continue to be satisfactory. In Nevada, outside of Storey county, in Utah, Arizona, Montana and Idaho, reports of activity, discovery and production are rife, and the general mining situation may be pronounced encouraging.

about 1,500 ft in length, giving several hundred ft of lift or backing to one of the best mines of that section.

EL CARMENA.—The extent of the work done on this mine, up to the present time, is a shaft some 300 ft deep and a tunnel some 100 ft in length, which has been done by parties of limited means, who were not able to erect a suitable mill and provide machinery requisite to successfully crush the ore. We have been assured, by good authority, that not a pound of ore has been taken out of the mine worth less than \$100, and from that to \$500 per ton. The last 53 tons taken from a little below the 300 level yielded \$1,700.

NEVADA.

SPARKO MINE.—*Herald*, July 1: The 4-stamp mill recently erected at the Sparko mine, commenced running in full blast last Monday. The mill is situated on Deer creek, a few hundred yards above the Providence mine. A tunnel has been run in about 300 ft on the ledge, which is of a fair size and contains rich sulphurets.

MOUNT AUBURN.—*Transcript*, July 2: Good ore was struck in the north drift of the bottom level at the Mt. Auburn mine, Tuesday morning. The ledge is estimated to be about 2 ft thick. The management have displayed much faith and nerve in their long-continued search for the lead which they have not encountered before in the lower workings of the claim.

ECREKA LAKE AND YUBA CANAL CO.—This company is making preparations to open their lead at North Columbia, where the ledge is about 10 ft thick, and if they can get the McKilloch hoisting works, they are being removed to the site where it is proposed to sink, and the shaft will be sunk as rapidly as possible. It is believed that this gravel will be found within 150 ft of the surface.

RICH WATZ DUMP.—D. Leach has met with excellent results in his experiment of sorting over the mammoth waste dump of the Banner quartz mine, on which work was suspended several years ago. Several half tons of ore were picked out from the debris and just crushed and assayed, yielding \$100 per ton in free gold and \$20 in sulphurets worth at the rate of about \$150 per ton. Mr. Leach proposes to work over all the ore in the dump, there being many hundred tons of it.

NOTES.—The Yuba water and mining company continue running a full head of water to Chalk Bluff and Blue Tent, and will be engaged to do so for several weeks to come. Jacobs & Sargent, Turner, Noyes, Sterling and all other mine owners down this way have been shut off, and will have to remain idle till the rainy season sets in.

CHLORINATION WORKS.—The erection of the new chlorination works at the Merrifield mine in this district has commenced, and will contain the most approved modern appliances for treating the large quantities of auriferous sulphurets produced by the mine.

SPARKO MINE.—*Foothill Tidings*, July 3: The strike made last week in the Wand & Blackwell claim at Snow Point in the upper part of this county is said by a mining expert who visited it this week to be most important gravel discovery made on this coast within 25 years. Numerous large nuggets continue to be found, and Supt. Blackwell is increasing the force, expecting soon to have 50 men at work.

YUBA M. M. CO.—This company has now got fairly at work. The ledge in the lower main tunnel is some smaller and of good quality. In the raise the ledge is of good size and quality—some of it rich. The mill is at work and everything running smoothly. The company have decided to build a new water wheel and flume and put in an air compressor and drills, intending to push the development of the mine as fast as possible.

SPARKO MINE.—This mine is on the other side of the river from the town of Washington. The owners are pushing the work on the mill, the frame of which is now raised. Report has it that a very rich boulder was found in the croppings last week, from which several thousand dollars was taken.

ITEMS.—The Last Chance mine at Sawmill Flat will soon be started, when a good sized crushing will be taken out at the mill, and if the return is satisfactory the construction of a mill will be commenced. Osborn & Co., owning the adjoining ground to the Last Chance, have a good showing. Arrangements are about being made with men of means to fully open up this property.

HYDRAULIC CLEAN-UP.—North San Juan Times, July 3: The Lone Ridge M. Co. made a clean-up a few days ago which was very satisfactory to the owners. They refuse to have the mine reworked, but they do say it was better than they anticipated.

PLACER.

FRANKLIN M. CO.—Dutch Flat *Forum*, July 3: This company is progressing steadily with the prospecting drift, which is now in 10 ft from the bottom of the shaft. No bedrock has been discovered as yet.

ITEM.—The supply of water in the South Yuba canal company's ditch is diminishing, so that they have been compelled to shut off the supply of several of the gravel mining companies in the vicinity of Quaker Hill.

MINING NOTES.—*Herald*, June 20: The mines are paying better than ever, both at Gold Run and Dutch Flat, and the times, in consequence, are booming. The Cedar claim at this place has commenced working for the first time this season, and expects to get in two or three runs. R. S. Alderson and others have located and are now engaged in sinking a shaft on a quartz lode at Secret Town.

MONO.

LAKE DISTRICT.—Mammoth City *Herald*, June 30: The ore which is now being run down to the mill is pronounced by all who are familiar with the products of the Lake district mine to be of higher grade than any heretofore worked from the Mammoth mine, and it is only fair to say that a result which will awaken a genuine interest in our mountain district and spur the owners of other properties to renewed efforts.

MERRIMAC.—This property lies between the True Blue and Monto Cristo, and there is quite a stir among the mining men in the neighborhood in consequence of the relation of the vein to those lodes. We have not seen the specimens, but they are said to compare favorably with the best samples taken from the Hardy winze of the Mammoth mine.

LAST CHANCE.—In this promising claim, situated on the southern end of Mineral hill, a splendid ledge of high grade ore was struck at a depth of 45 ft on last Tuesday evening. The specimens shown were certainly of a most encouraging character.

LAUREL HILL DISTRICT.—We learn that the inclined shaft of the I. X. L. has now reached the depth of 45 ft, with a body of first-class ore 3 ft in width which assays from \$200 to \$500 per ton in silver. Two tons of this ore will be taken to the Indian Quen mill in Oneota district for a trial test.

BODIE DISTRICT.—*Free Press*, July 4: In the McClintock mine during the week a ledge of fine-looking quartz came down the west side, and is dipping to the east much faster than any other ledge in the mine, except the large ledge of good ore on the 675 level (inclined). Connection has been made from the new shaft with the 500 level of the old incline, and work has been resumed on the west crosscut No. 2 of that level, which is now in 336 ft. The ground is porphyry mixed with bunches of quartz and pyrites of iron, and looks very favorable for striking the ledge.

STANDARD CON.—The new shaft has been sunk during the past week 12 ft, making a total depth of 854 ft, with no change to note in the character of the formation passed through.

UNIVERSITY.—Work is prosecuted vigorously at all points. During the week a 3 ft ledge of good ore has been cut, showing strong, clean walls.

SPARKO MINE.—The drift north from the drift is in 130 ft, having been run since last report 26 ft. The face of the crosscut is in very hard rock. The south drift on the East Summit vein is in 45 ft; progress for the week 10 ft. The ledge is 6 ft wide.

BULWER.—The south drift on the Ralston vein, 300 level, has been run 19 ft, and the south drift on the Stonewall vein 22 ft since last report. The ledge in the Ralston slopes is from 13 inches to 4 ft wide. In the Stonewall slopes the ledge is small—about 2 ft wide.

OLD MONO DIGGINGS.—*Homer Index*, June 26: A

number of miners have located quartz leads in the old Mono diggings, and some work is being done on them. The ledges are of good size, and crop out strongly in places. The ores are free milling and carry considerable gold. We understand that some parties are going to build an arrastra there to test the ore.

PLUMAS.

GOLD STRIKE.—*National*, July 3: This mine, situated at Wolf creek, is said to be looking exceedingly well. The mill is running steadily, and the property stands up to its reputation as a producing mine, in a manner extremely satisfactory to its owners. The mine, mill and houses are in excellent condition.

CURTIS.—A dry streak found in Elizabethton flat, by Loring & Leavitt last week, promises to be permanent, and very rich. Five dollars to the pan have been obtained, and several coarse, rusty pieces show that they have the old lead, which yielded so plentifully in the old workings. Loring & Leavitt have hunted the lead for years, and their tunnels, in the aggregate, will measure between 3,000 and 4,000 ft.

SHASTA.

MAD OX MINE.—*Redding Independent*, July 1: Mr. Strode of the Mad Ox mine at Whiskeytown thinks they will run their mill until the middle of July, when they will shut down for the season to make repairs and enlarge the mill dumps. The mill is crushing rich rock.

FRANKLIN GULCH.—We have been informed that that lucky miner Shafter last week crushed some 4 or 5 tons of quartz, and got the handsome sum of \$33 ounces.

SIERRA.

BLACK JACK.—*Mountain Messenger*, July 3: We learn that the company intend to start a tunnel 100 ft lower than the present one next week, and will, when this is completed, put up a 10-stamp mill. They also intend to put several concentrators into the present mill to save sulphurets, of which there are large quantities, and rich.

SAVAGE PLACER.—The tunnel has passed through the last white rock (a mixture of quartz and granite) and entered a slate formation which is much softer. The recent rich strike in an adjoining claim was made at a point about 400 ft east of the east line of the Savage Placer, in what is supposed to be an overflow from the main channel that passes down through the ridge. At a proper point in the slate rock the Savage Placer folks will make an upraise to the gravel.

TRINITY.

BUCKEYE M. CO.—*Journal*, July 3: We learn that there was a large break in the old Bolt's Hill ditch last week, caused by a tree falling in the ditch and damming the water during the night time. Previous to that the mine had been running with a full head of water, and will be again as soon as the ditch is repaired, which will be in a few days. Work on the bedrock tunnel is progressing at the average rate of 65 ft per month. It is now in a distance of 1,300 ft, and it is expected the remaining 200 ft will be run and the tunnel completed in about 3 months. The upper end of the main ditch to Stuart fork is going ahead, and the water of Owen's creek has been turned there.

ITEM.—One day this week Fred Diener pounded up a pound and a half of rock from the Monto Cristo mine at Deadwood, and obtained 2 ounces of gold, lacking only \$1.

TUOLUMNE.

OLSEN MINE.—*Union Democrat*, July 3: A 15-stamp mill, with capacity for an additional 10 stamps, will be built as soon as possible on the Tuolumne river, 4 miles from the mine. A contract for grading a road to the mill and the mill site has been awarded. About 300 tons of ore is lying on the dump at the mine. The mine is being placed in condition for stopping, which will take about 6 weeks.

ALABAMA.—The owner has commenced building a 40-stamp mill on this fine property. Mr. Harris thinks the mill can be kept at work the next 50 years, the body of ore is so great. It is low grade, but steady in its character all through the vein.

COLUMBIA NOTES.—July 3: Another big strike in quartz has been made in Columbia by La Roy Reed & Co. The ledge is of good size, and is extensive, and the Levy mine, at Wet gulch, as the place where the strike is made appears to be on a direct line with it, on the opposite (north) side of the South Fork of the Stanislaus. It is stated by our informant that in 2 days Mr. Reed has pounded out, in a hand mortar, the sum of \$3,200.

JAMESTON NOTES.—Messrs. Miller and Frank Holmes, from their mine, near Quartz mountain, have recently had 20 tons of ore crushed, yielding the sum of \$5,000. The Quartz Mountain mine, near Jameston, is reported to have been sold to New York parties.

NEVADA.

WASHOE DISTRICT.

YELLOW JACKET.—*Gold Hill News*, July 7: The Crown Point hoists through the Jacket the debris which is taken from the drift connecting the 2525 station with that mine as the work of grading down progresses. Cutting out stations on the 2525 and 3000 levels; also drifting from these stations east toward the ledge.

UNION CON.—The drift from winze No. 1 toward winze No. 2, and on the 2500 level, continues in fine quartz, some of which assays richly. The drifts northeast toward the Sierra Nevada incline, 2500 level, and south from the shaft, are both running ahead and are without change of material passed through. The drift from winze No. 1 toward the 2500 station of the Sierra Nevada incline is so near that point that connection can be easily made when needed and when the water is out of that station.

JOINT.—Crosscutting east joint with Mexican on the 1600 level to reach the line of the drift at the 1300 level of the Sutro tunnel. The joint crosscut east, 2500 level, is going ahead from 5 to 6 ft per day, and the drift north from the main drift east at the rate of 4 ft per day. These workings are in a heavy vein material and are looking well.

HALE & NORCROSS.—The winze from the 2200 to the 2400 has been opened for ventilation of the latter level of the Chollar during repairs.

UTAH.—The station set for the 2050 level of the incline is in place. East crosscut, 1060 level, in 25 ft and in good ground for progress. The ore vein lies to the east of the shaft. The diamond drill which was operated on the 1050 level found no pay ore, but developed some good prospects.

DELCHER.—The south drift, 3000 level, has been extended a total length of 438 ft, and discontinued on account of heat. The drift north is within 40 ft of the Crown Point line and making good progress. Its connection with Crown Point workings will give needed ventilation.

THE NORTH DRIFT.—The drift north at the 1300 level is in 90 ft, and in low-grade quartz which gives promise of something better near.

COS. VIRGINIA.—Running south on the 2300 level and toward the Best & Delcher winze. This winze will be continued below the 2000 level some time this week. Extending east crosscut No. 1 at the rate of 5 ft per day.

SURRA NEVADA.—Still running west on the 2300 level toward the line of the main drift; total length of drift, 255 ft. The north drift, 2400 level, is 905 ft in length, and making good progress along the vein.

BEST & DELCHER.—Chambering out on the 2000 joint with Con. Virginia for a winze to the 2300 level. Sinking will be commenced this week.

NEW YORK.—The drift north and south along the vein on the 1000 level promises well. The quartz continues clear and kind, but mostly less than milling grade.

QUINN.—Raising from the 200 level toward the old shaft, also sinking in that shaft. When connection is made the 200 level will be thoroughly prospected.

SUTRO TUNNEL.—South header stopped for the present; total length 2703 ft. North header running rapidly on; measurement for the week just made in time for this issue, but is about 3,650 ft. Track for air motive nearly completed up to the point where the drain boxes are above the floors of the tunnel.

AURORA DISTRICT.

REAL DEL MONTE.—*Esmeralda Herald*, July 3: The work during the past week has been concentrated in sinking the main shaft. Good progress has been made, about 20 ft being accomplished. The formation grows less broken as depth is acquired.

THANKSGIVING.—There is no material change in the character of ore being taken from this mine, except, if anything, it carries more metal. The mine is looking better every day in point of permanency, and the more it is developed the wider the ledge grows.

LORENSBURG.—This property is located on Last Chance hill, and is owned and being worked by T. W. Gupit, who is taking out some very fine rock for milling. In early days this mine was known as the Heath.

EXCELSIOR.—The tunnel is now in 316 ft, 43 ft having been run the past month. It is calculated the tunnel will tap the ledge at a depth of 150 ft below the surface. Several strings of quartz have been cut, carrying more or less metal.

CORTAZ.—William Pool is still peering away on the Cortez, taking out ore. This is a splendid mine, and will come to the front boldly one of these days.

THE PROSPECTS.—Work on the tunnel and shaft progresses with favorable results. Yesterday some fine ore was taken out.

BRISTOL DISTRICT.

HILLTOP CO.—*Pioche Record*, June 25: The Mendia, of the Hillside company, is now shipping to the furnace 32 tons of ore per day, the number of teams hauling being increased to 13, and capable of bringing in enough ore to keep the furnace in steady operation for some time to come. The Hillside has been improving the past few days, especially on the 5th level east, 380 ft from the incline, where a large body of heavy lead ore has been encountered, which looks very promising.

NOTES.—We understand that the mine will be renewed on the Mayflower mine, of the Bristol silver mining company, the coming week. The furnace is running well. Ore has been scarce on the dump, but is now coming in fast.

COLUMBUS DISTRICT.

NORTHERN BELLA.—*True Pioneer*, June 20: The usual amount of ore is being taken out and shipped daily to Belleville. One of the mills has been shut down for the past 3 days, and will probably remain idle 3 days longer, when it will be started up again in good working order. The mine is looking as well as usual.

MOUNT DUBLIN.—The main shaft is now down 74 ft below the 245 level. The east drift on the 3d level is in 108 ft, and is now in good running ground. On the 2d level the east drift is in a distance of 213 ft, and the rock is extremely hard. The west drift from crosscut No. 1, following the vein, is in 47 ft. The face of this drift is in fair milling ore. The east drift from crosscut No. 1 is in 39 ft and in high-grade ore. The ore dump contains now 125 tons, which will mill from \$150 to \$200 per ton.

NEW YORK.—This week a 9-ft ledge has been struck, carrying \$124 per ton. Much depth has yet been attained, but by next week work enough will have been done to determine something of the real value of the find.

LUCKY HILL.—The incline has made 10 ft progress during the week, the total depth now being 140 ft. It is in ledge matter all the way. Chloride and manganese are coming in on the footwall.

GENERAL JACKSON.—The new whim works well, and headway is being rapidly made. A crosscut has been started north from the bottom of the incline, and has now reached a distance of 20 ft. The crosscut is all the way in ledge matter, and the face is ore.

THE O. K.—Work has just been commenced on this mine, and at a few ft from the surface the ore assays \$210 and \$180.

EUREKA DISTRICT.

HODGSON MINE.—*Sentinel*, June 30: The Hodgson mine in Secor county, will be worked energetically this season. In the first excitement which rushed the White Pine miners over this way, it was the wagons which carried ore from this mine to the mills at Hamilton, which they followed back. It was rich and extensive bodies that were opened up. Other excitement took attention away, but now the owners, the Hodgson Bros., propose to see what is below the croppings.

TOWNSEND CO. GAZETTE.—These mines, north of Adams hill, at a depth of 80 ft, have struck the footwall, and will immediately commence drifting for the pay streak in the ledge matter. This property is eligibly situated, and the ore is of high grade. We would not be surprised if it proved dividend paying, and that before long.

EL DORADO.—The ore in this mine is improving in extent and quality as it is being opened up, and now shows a broad about 10 ft wide. The ore is a rich chloride, and assays from \$315 to \$346. Mr. Riley has about 40 tons on the dump, and as soon as connections are made with the ore chamber, a number of men will be employed, and regular shipments made to the smelting works.

EUREKA TUNNEL.—The contractors in the Eureka tunnel have been making good headway during the past 10 days, and has the tunnel now in 1,200 ft. The last 20 ft has been run through belt of red shale, the face of the tunnel being in the same formation. Everything indicates that the main ledge will be cut before many more ft have been run.

LIDA VALLEY DISTRICT.

MINING NOTES.—*Cor. Esmeralda Herald*, July 3: James Andrew, late of Candelaria, recently purchased the Gold Mountain mill, and will start it up as soon as a supply of wood can be secured. R. H. Stewart will start up the Lida Valley mill, and Aug. 1st. At Tulare canyon, within the last few weeks, a "dry washing" machine for placer mining has been introduced, which is spoken of highly.

NEWARK DISTRICT.

BAY STATE MINE.—*White Pine News*, July 1: Supt. McGrath, of the Trench, received a dispatch Tuesday evening from Supt. Thomas Winslow, of the Bay State mine, at Newark, announcing that a rich and extensive bonanza had been struck in the latter mine. The Bay State has already produced much rich ore, and bids fair to become one of the most valuable mining properties in eastern Nevada.

PARADISE DISTRICT.

PARADISE MINE.—*Reporter*, June 20: The Paradise mine never looked better. There is an abundance of good ore in sight, and are long we predict this mine will be classed among the dividend-paying mines of the State.

BULLION.—This mine is again coming to the front, with the very best of prospects. The mill is running regularly on good paying tailings, and they have struck a large and very fine body of ore in the mine, and the vein is rich and quantity of ore is being hauled out.

NOTES.—There is quite a number of other good prospects in the camp. Among them we may mention the Glory, Mount Rose, Wild Goose and Mary Wilder; upon all of them work is being vigorously prosecuted.

OSCEOLA DISTRICT.

MIXING NOTES.—*Cor. White Pine News*, June 23: The mill is now running in good shape and the mines are developing well. The recent striking of the north and south channel, in our placer grounds, has caused quite a rush among the placer miners, and about 500 acres of ground have already been located upon the supposed course of the channel, and the parties making such locations feel very confident of the value of their ground.

WILLOW CREEK DISTRICT.

ANOTHER DISCOVERY.—*Silver State*, June 23: We have been informed that prospectors have discovered a rich ledge 6 miles north of the Ohio mine, on Willow creek, and have started to work it. They found float gold from the ledge some time ago, and traced it up by running out until they finally found the lead, which is said to be very large.

ARIZONA.

TOMBSTONE DISTRICT.—*Cor. Tucson Record*, June 30: In the Contention they have struck quite a body of ore running north on the 102 level as well as struck the ledge at the 312 level. This mine is looking well and must have about 500 tons of ore developed.

HEAD CENTER.—The vein in this mine has been tapped at the 310-ft crosscut, it was found rich in free gold and horn silver, being the same character of ore found at the 270 level. The 210 level is to the north 340 ft from the working shaft, and is still being driven ahead in good milling ore. This same level is in the south 112 ft and assays from the face of the drift average over \$300 to the ton.

GLOBE DISTRICT.—*Silver Belt*, June 26: The Nugget mill is now ready to run and has a supply of 1,000 tons of assorted ore on the dump, which is expected to yield not less than \$200 per ton, besides about 2,600 tons which will average between \$50 and \$80.

MIXING NOTES.—Another extensive strike of exceeding richness is reported in the Stonewall Jackson. The Chamberlain mine is showing a strong vein of milling ore. This mine is regarded as one of the best mines of the district. The Chromo is producing well. The proprietors have about \$6,000 of their best ore sacked. The Hartford, the property of J. L. Clark, shows a strong vein which assays \$100. The Diana, near the Hartford, a 4-ft ledge assays from \$10 to \$400 per ton. The ore is carbonate and bears a strong resemblance to the frene.

ARIZONA DISTRICT.—*Tucson Record*, June 26: The Con. Arizona, the largest mine in Arizaca, is now being opened up. They have the hoisting works in operation taking out the water preparatory to pushing down developments.

ITEMS.—The Dick Orant mine is down about 20 ft and with about 4 ft of high grade ore. The Peacock is down 100 ft, and levels are being run off and are showing good ore. The Silver Eagle is pushing work as rapidly as can be done by hand, and are grading for hoisting works. There are a good many men at work on this mine. Both mills are running and turning out a good deal of bullion.

BIG BUE DISTRICT.—*Arizona Miner*, June 26: Mr. Houghton, engineer of the Valley Forge Co. M. Co., arrived at Big Bue on Friday last and at Prescott to-day. He intends to put up the quartz mill of the company, while he is on the ground, and commence the production of bullion. He has examined some of the mining properties belonging to the Valley Forge people, and is much pleased with the prospects. Money, machinery and mines this company possess, and it is only a question of time when they will send forth large yields of bullion.

COLORADO.

BOULDER COUNTY.—*Caribou Co. News*, June 25: At present the Caribou has to show a splendid shaft house, 50x100 ft, with probably the finest hoisting apparatus in Colorado, embracing two friction spools, 60-horse power engine, etc. Its main shaft is fully 300 ft deep, with drifts innumerable. It is working about 50 men, under Supt. E. B. Smith. The ore is all treated at its own mill at Nederland, six miles below this point, by the chlorination and amalgamation process. This weekly shipments of bullion mounts always into the thousands.

SILVER STAR.—This mine is near the Caribou, and the main shaft is 500 ft deep with many drifts at various levels. The output of excellent ore is large.

SHERMAN.—At a depth of 110 ft a tunnel level has been worked 100 ft along the vein and produced about \$250,000 in money. From this level they sunk the shaft, on good mineral all the way, and the mine is now in capital working order.

CO. COUNTY.—*Cor. Georgetown Courier*, June 26: The Republic lode has a 200 level and a 75 level, which show an ore vein from 10 to 12 inches thick, composed principally of galena and copper pyrites carrying silver and gold. They have also just struck ore in the lower level, having run a crosscut 125 ft to the lode. About 100 tons of ore has been taken out, the most of which was shipped to Black Hawk and milled from 100 to 125 ounces in silver per ton. The quantity of timber handy to the mines, and no trouble from water.

IDAHO.

CARBON DISTRICT.—*Enterprise*, July 1: Two years has produced a wonderful development of fine gold veins in this camp. The Robinson, Oneida, Northern Light, Iowa and others, besides a dozen or more other prospects on the main Carbon mountain are the equals of the best mines yet discovered, and when mills are set in operation, we may expect a grand boom in this region of country.

IDAHO CITY ITEMS.—*World*, June 30: The Golden Fleese Co. is still pushing work ahead on the mine. Two drifts have been run east and west on the vein from the face of the tunnel, and good ore is being extracted. Each drift has been extended 45 ft. Stopping will soon be commenced.

MONTANA.

BANSOCK DISTRICT.—*Atlantis*, June 23: Among the new developments recently made up Graceland copper creek, we note the Flagstaff ledge. They have followed a very rich crevice of ore between well-defined lime wall rock, which has widened from almost nothing to 10 inches. It assays \$438 to the ton, \$304 in silver and the remainder in gold.

GRANDLIFE ITEM.—Ore is now so plentiful in the mines here that 1 man is taking out as much as 16 others can have done some time ago. The way and strength is now sight to run the old and new furnaces for 2 years hence, at the rate of 100 tons per day, yielding \$140 to the ton.

YELLOWSTONE PARK.—A town named Cooke City has been laid off on Soda Butte creek, Yellowstone park, where Jay Cooke, T. W. Bates and others are preparing to put in extensive workings. The initials of the new smelting company are E. M. M. & S. Co. A large force of men is to be put to work.

UTAH.

TOLE COUNTY.—*Cor. Salt Lake Tribune*, June 26: The district of Stockton is livelier than for a long while, and Gen. P. E. Connor has made a great change about the Longmaid smelter, and he is laying a solid foundation for a permanent and successful future. The working of the ore now being extracted in large quantities from the Great Basin mine, which to-day is one of the most valuable mining properties in the Territory.

SUMMIT COUNTY.—*Park City Co. Salt Lake Tribune*, June 26: The Ontario has stood out prominently for years as one of the best mines on the face of the globe. Although vast quantities of

Utilization of Additional Species.

[BY W. N. LOCKINGTON.]

New Sources of Food.

Advance in civilization is marked by an advance in the choice of food. In the words of Spencer, "There is an analogy between progress in bodily nutrition and progress in mental nutrition. The higher types of mind, like the higher types of body, have greater powers of selecting materials fit for assimilation."

As there is room for much further advance in mental nutrition, so is there for much advance in bodily nutrition. The choice of food has hitherto been determined empirically. Prejudice is the usual guide. A few experiment with foods, and finding some hitherto unused or little known article to be exceedingly nutritious, or to supply a want, they recommend its adoption, but either their recommendation is unheeded, or the new article wins its way into favor with exceeding slowness.

The multitudinous forms of animal and vegetable life could furnish us with many an article of food equal or superior to those in use. We have not yet been through the full range of nature in our search for food. Yet our wide-spreading commerce has made us familiar with many foods that were formerly unknown, so that, prejudiced though we are, our range of food is wide compared with that of our ancestors, or that of a savage, but almost all the plants we grow for food purposes, as well as almost all the animals we eat, are, if not those used by our own ancestors, those which have been used for ages by other peoples with whom we have come in contact. It is the same with animals and vegetables used in the arts. We have adopted them from others—few indeed have had their merits discovered and utilized.

The seed of certain grasses and certain leguminous plants have for thousands of years been the chief sources of nutriment procured by man from the vegetable world, and they fulfill his purpose well; but the two immense orders of *Leguminosæ* and *Gramineæ*, the latter entirely, the former chiefly composed of plants that are adapted for food, could furnish many additional species that would not only vary our dietary, but give us a supply or food under conditions that preclude the growth of species now in use. The number of fruits cultivated might be greatly increased. Almost every section of country furnishes some nut or berry which even in its wild state is pleasant to the taste.

What might not cultivation do for some of these. It has given us all the varieties of plum and cherry, apple and pear, from sour and unpromising originals, and the long category of vines from one European species. Many edible roots, stems and leaves have yet to be discovered or improved into value.

A few species of the order *Cruciferae* are eaten, while the rest are neglected. Yet the whole order is good for food. A botanist could multiply examples throughout the range of vegetable life, but it will suffice here to give one more; the mushroom or fungus tribe, so little known, so much dreaded, yet containing so many edible species. Again and again it has been shown that the same amount of observation which enables a man to distinguish night-shade from the potato, or carrots from hemlock, would enable him to discriminate between the poisonous and edible mushrooms, yet only an enthusiastic hand ever dares to venture beyond the conventional species. The species favored by the Anglo-Saxon is in ill-favor with the Italian, who has a wider range of edible fungi, as have also the Frenchman and the Russian.

As mushrooms can be grown in places where ordinary plants will not flourish, an increased taste for and knowledge of them would be of great benefit to our poor. If from the vegetable world we turn to the animal, we find prejudice and ignorance still more rampant. The Mosaic law is still obeyed in this matter by nations who break it in most others.

The ordinance which restricted the Israelites to the use, for food purposes, of such quadrupeds only as chew the cud and divide the hoof, was in the then state of knowledge a wise and safe one.

All such animals are herbivorous, and are better fitted for food than carnivorous mammals. They are of large size, furnish an abundance of healthy muscle, and have in many instances been domesticated for ages. But numerous other large animals are herbivorous also, and extensive series of small animals are graminivorous or frugivorous, devourers of seeds or fruits. Why should not these be eaten? The omnivorous pig, whose diet, at least in a state of domestication, is not particularly choice, and whose flesh is less nutritious and less wholesome than that of most other mammals, is largely eaten by man, yet the prejudice against horse flesh is almost universal among Aryans.

We occasionally eat a hare or rabbit, but the rest of the rodentia, mostly seed or root-eaters, are neglected. The ground squirrels, a plague on the Pacific slope of the United States, would cease to be so were man to make a systematic onslaught upon them to gratify his taste. Their flavor is pronounced excellent by all who have tried them. The taste for this or that particular article of food is to a great extent acquired.

Many who ultimately become fond of oysters dislike them at first. The same remark holds

true of many other foods in common use. The muscles of all birds and mammals are suitable for food when in a perfectly healthy condition. More care is necessary in the case of carnivorous mammals, since their flesh decays more rapidly; yet it is doubtful whether one person in ten could distinguish cat from rabbit were they cooked alike and the more tell-tale portions removed.

The strong or fishy flavor of marine mammals and birds would doubtless be objected to by those whose gustatory nerves had learned to relish high game and Limburger cheese, yet as safe sources of nutriment they would at least be superior to the former.

Civilized nations of Aryan descent devour many mammals and birds, some batrachia and many fishes; but the intervening class of reptiles is almost wholly ignored. Why? Simply because of the pious horror of the snake. Lizards, as they have long tails, are viewed only a little less unfavorably, while tortoises—thanks to their widely different form—are accepted with some reservation; yet the flesh of snakes and lizards is as firm, as nutritious and as healthy as that of fishes, if not more so; and those who have eaten them when among peoples who do not share our prejudices, have had their own shaken. The Frenchman, who is a good cook, eats frogs; the Englishman cannot conquer his prejudice.

Leaving the vertebrata; the choice made by civilized nations among the invertebrata is highly eccentric.

A Spaniard or Frenchman relishes a cuttle fish, which an American or Englishman shudders at; and the harmless snail and slug, *per se* as good food as oysters, are esteemed by some nations and detested by others.

There is little doubt that the great majority of molluscs of sufficient size are healthy food, and that man has yet to discover among them many a *bonne bouche*.

Descending lower still, sea-urchins, sea-anemones and sea-cucumbers are eaten by some highly civilized nations, and who can tell how acceptable they might prove to an Anglo-Saxon could he but conquer the horror he feels at their appearance.

P. H. Gosse, so well known for his interesting works on natural history, tells us how he cooked the common sea-anemone of the English coasts (*Actinia mesembryanthemum*), and how fond his little one became of it, asking for "more tinnies."

Probably the classes of animals which are of least value as food to man are those included in the sub-kingdom, Arthropoda, namely, insects, arachnids, myriapods and crustacea, the multitudinous types grouped together as *Vermes*, or worms, and the uni-celled organisms, or Protozoa. Some of the larger crustacea, known as crabs, lobsters, crayfish and shrimps, are eaten as delicacies, and it is probable that many other species are equally edible, but the vast majority of the class is only of value to man inasmuch as it furnishes food for larger marine animals.

Insects are eaten by many wild tribes. Some of the Indians of the Pacific coast find in the abundance of grasshoppers that plague the white man, an abundant store of food. Similar Orthoptera are largely consumed by the natives of South Africa, and those of some of the Sunda Isles esteem dragon-flies a great delicacy, catching them, according to Wallace, on bird-lined twigs. Though there can be comparatively little nutriment in the soft bodies of insects, yet there is no reason for the horror with which they are regarded, as articles of food, by the Aryan races. A fancy for the flavor of the Rocky Mountain locust would go far toward decreasing the devastation of that dreaded pest.

Some of the marine worms are accounted delicacies by certain tribes, but the greater part of the varied forms belonging to the sub-kingdom must be regarded, so far as they are useful to man at all, as only indirectly so through their consumption by animals he feeds upon. The same may be said of the Protozoa, which, swarming in countless numbers in sea and river, lake and marsh, furnish food for the creatures above them.

Putting aside all question of protection or preservation of plants and animals now used as food, the examples adduced are sufficient to show that the range of foods might, with advantage, be greatly extended.

Much remains to be learned respecting the diseases and bodily states of cold-blooded animals and of the invertebrata before we can use them for food with the same confidence with which we eat beef, mutton or poultry. The diseases of the higher animals are, to a great extent, similar to our own, and we have learned how to discriminate; but we do not recognize the diseases of fishes, crabs and shell-fish. The stories of poisonous fish probably arise from this source. Every year we hear of cases of poisoning, well authenticated, from eating mussels, lobsters or other crustacea, or mollusks, which are usually healthy food. All these creatures are subject to diseases which we have not yet studied, and it may be that at certain seasons, such as immediately after reproduction, some of them are unfit for food. This is one well-grounded cause of prejudice, but one which will be removed as our knowledge of the lower forms of life extends.

New Sources of Useful Materials.

The animal and vegetable world furnish us with other things besides food. Materials of other descriptions furnish, by their manufacture, a means of procuring food to some, while the articles manufactured are of use to all. Commerce, which has made us familiar with foods previously unknown, has helped us still

more in this direction, yet when we consider the great variety of vegetable and animal life, we cannot but believe that much more remains to be discovered, or, at least, utilized.

Other nations, many of them but semi-civilized, others barbarous, have, in these things, been our teachers. As maize and potatoes were known to the Indians before we learned to use them, so was *Phormium tenax* to the Maoris, and cotton to the Hindoos and Chinese.

When it is remembered what vast industries depend upon the supply of fibrous plants, and that a fiber with different qualities, as it could be applied to new uses, would start a new branch of trade; when we see how extensive are the manufactures carried on from gum-resins like caoutchouc, or gutta-percha, we must acknowledge that the discovery of a fiber or a resin with new uses would furnish a livelihood to many additional workers. Take paper for example. Until lately this article was made from linen rags, but as the supply of that material fell short of the demand; cotton waste, straw, the Yucca plant, and other vegetable materials came into use, and it is evident that it can be made from almost any fibrous substance reduced to a pulp. Few are the plants that cannot be utilized by man. If valueless for food or for building purposes, a fiber, a gum, an essential oil, a medicinal product, may be found in most.

The constantly-increasing stock of geographical and botanical knowledge brings new materials into the notice of scientists, and the constantly-increasing needs of mankind brings them slowly into public notice. The secretion lately found in Arizona, upon the branches of *Larrea Mexicana*, and of another plant, may yet enable us to dispense with the imported lac from Asia. Chemically the two seem identical; practically the despised Indian, here again our teacher, has long ago proved its use in the mending and making of vessels for cooking purposes.

Here is a case of a new material furnished by the animal kingdom, for it appears almost certain that the secretion, like that of wax or honey, is elaborated by the insect from the juices of the plants it feeds upon. Insects, so little used for food, so terribly destructive to our food plants and annoying to our domestic animals, may yet yield to us many useful materials; may yet prove in this respect among the most useful of organisms. Silk, honey, wax, gum-lac, cochineal, all are insect products, elaborated by insects from plants; and the last two are the produce of *coccideæ*, those destroyers of our orchards and oranges. Does not this point a way to the utilization, in some cases, of our insect pests?

The higher animals may not furnish us with many additional materials. Horn, hair, fur, wool, hides, feathers, bone, ivory, have their known uses. Improvement here is to be looked for rather in new uses for known materials than in the discovery of new ones. But the lower animals may yet yield us many useful substances. The great treasure house of the sea holds more than we have yet learned the use of. Shells, corals, the horny axes of soft-corals, and many other portions of marine animals, may be utilized for something more than show; and other secretions may be found as useful as those of the sepia. But though the number of useful species—useful either directly or indirectly—is so large that it includes probably the greater portion of existing organisms, yet some are far more useful than others, and some are directly injurious to more useful organisms. Such species need not be cultivated, except where they do not come into direct competition with more useful ones; but their consumption or use by man would diminish their numbers and give room for the more useful forms, which are now often permitted by man, even in his own cultivated fields, to be crowded out by the less useful.

A MOUNTAIN OF OBSIDIAN.—Near the foot of Beaver lake, in the National Park of Yellowstone, a recent party of explorers came upon a remarkable mountain of obsidian or volcanic glass, which rises in columnar cliffs several hundred ft. in height. As it was desirable to pass that way, the party had to cut a road through the steep glassy barricade. This they effected by building huge fires on the glass to thoroughly heat and expand it, and then dashing the cold water of the lake against the heated surface so to suddenly cool and break it up by shrinkage. Large fragments were in this way detached from the solid side of the mountain, then broken up small by sledge hammers and picks not, however, without severe lacerations of the hands and faces of the men from flying splinters. In the Grand canyon of the Gibson river, the explorers also found precipices of yellow, black and banded obsidian, hundreds of ft. high. The natural glass of these localities has from time immemorial been dressed by the Indians to tip their spears and arrows.

INTENSE COMPETITION.—The most remarkable exhibition of the capacity of the foreign importers to compete for the trade of the whole interior of the country was afforded by the demand of an Iowa member of Congress for the remission of the import duties on foreign salt used in curing beef and pork in that remote Western State. This foreign salt hears all the cost not only of the transit across the ocean, but also that by rail from the seashore to the frontier, a distance of a thousand miles.—*North American*.

Progress in Bodie District.

One of the evidences of increased confidence in Bodie, says the *Free Press*, is the fact that new and more extensive works are constantly devised and added to those already in operation. The managers of a group of mines, comprising the Noondays, Red Cloud, Oro, Concordia, Maybelle and Paris, have adopted a plan for the draining of those mines which is at once economical and sensible. The companies named will contribute pro rata for the sinking of one large shaft. The shaft of the Red Cloud, which is now 400 ft. deep, has been selected, and will always be kept deep enough to drain the group. Already the work of enlarging the Red Cloud shaft has been commenced, and is in progress from the 400, 250 and 125 levels. In about six weeks it will be completed, with three compartments, two for working purposes and one for a pump. Thereafter the shaft will be steadily kept going down for an indefinite period—certainly until a depth of 1,500 to 2,000 ft. is attained. The fine Corliss engine, now in use at the Noonday mill, will be transferred to the Red Cloud shaft and utilized as a pumping engine. Beside this co-operative work, there are other signs of progress in the district. The Noonday mill, which has now 30 stamps, is to be increased to 40; and the Bodie tunnel company is about to build a mill of perhaps 20 stamps, in order to reduce its own largely increasing ore. At the Belvidere new and more efficient hoisting works are near completion; the Syndicate company is putting an engine and hoisting machinery in the tunnel about 2,000 ft. from the mouth; and the Glynn-Dale company is erecting new machinery on its ground. These costly preparations for extensive and systematic mining are the best indications of the confidence which men of capital repose in the future of Bodie. Besides this they are generally cheering.

RICH QUARTZ IN SHASTA.—We learn from a late number of the *Shasta Courier* that work on a number of the claims on the great Iron Mountain gold and silver lead is progressing as rapidly as circumstances will permit. The mines have been difficult of access, situated as they are high up on a rugged mountain, but the completion of Camden, Magee & Co.'s Shasta and Iron Mountain grade, which is almost, if not quite completed, will greatly improve matters in that respect and facilitate operations in future. All the work done on the great lead so far only serves to increase the belief in the almost fabulous richness and the vast extent of the truly wonderful ledge. Innumerable assays have been made from ore taken from various locations extending for a distance of over five miles, and the result is all the way from \$40 to \$550 to the ton. Many of these assays have been made by the best assayers in San Francisco, and those made there correspond with results reported by other assayers who operated on portions of the same ore. Prospectors and mining operators continue to wend their way through our town hound for the mountain of promise, the fame of which is rapidly spreading through the land. And no wonder its fame is extending. Just think of a gold and silver-bearing ledge varying in width from 20 to 1,000 ft., and plainly traceable by croppings along the mountain for a distance of seven or more miles, and the rock assaying as above. Why the very idea of such wealth is calculated to make the misers of the world go crazy, and even the sleepy fogies of the old town of Shasta jump up and howl with delight.

A PRODUCTIVE MINE.—The Ontario mine, in Utah Territory, is one of the most valuable mines on the coast. Over two years ago it paid the first dividend, and has paid them with delightful regularity ever since; and it is reported that enough ore for another year's dividends is at the miners' hands. The vein of the Ontario is about four feet thick, and carries ore which yields an average of \$100 per ton. The deepest level in the mine is 600 ft., but the 700 will soon be opened. The ore is said to be refractory, but is very skillfully manipulated. The company's works are extensive and thoroughly complemented. After the ore is pulverized in the powerful 40-stamp batteries it is subjected to a chloridizing roasting in two Stetefeldt furnaces, and the percentage of chlorination of the peculiar ore is relatively high. The roasted ore is then amalgamated.

GROWTH OF OUR MANUFACTURES.—The hands employed in this country in the production of agricultural implements now number 40,680. Maine has 282; New Hampshire, 245; Vermont, 495; Massachusetts, 646; Rhode Island, 108; Connecticut, 790; New York, 7,237; Pennsylvania, 3,097; Delaware, 71; Ohio, 10,248; Michigan, 1,938; Indiana, 2,536; Illinois, 7,870; Wisconsin, 2,700; Minnesota, 330; Iowa, 1,104; Missouri, 1,074; Kansas, 261; Nebraska, 81. In 1850 the country had 5,361 hands engaged in this branch of industry. In 1860 the number had increased to 12,867, and in 1870 it had reached 23,251, or over 17,000 less than the figures of to-day. Ohio shows the most decided advance of any State, her employed being only 165 in 1860, while this year, as shown above, there are 10,248.

IN May the Stormont mine in Utah produced \$54,000. It said the reserve in this mine warranted the expectation of a production of \$50,000 to \$60,000 per month for some time, and that dividends will probably be resumed in August on a more liberal scale than last February.

THE ENGINEER.

A Wonderful Little Steamer.

A St. John's (N. F.) dispatch, dated the 22d of June, says: The little steamer *Anthracite*, which left London, via Falmouth, England, 18 days ago, on a voyage across the Atlantic, arrived at this port yesterday. She is the smallest vessel that ever steamed from Europe to America. Her total length is 84 ft., beam 16 ft., and depth 10 ft., her engine and boiler room being 22 ft. 6 inches. Her gross tonnage is 70.26 tons. The voyage was undertaken for the purpose of testing the capabilities of the Perkins system of high pressure engines, and the success that has thus far been achieved by the little vessel is likely to lead to a revolution in marine architecture. Throughout the entire passage the weather was unusually boisterous, and there can be no doubt that under more favorable circumstances the time of the little ship would have been much better.

The economy in the consumption of coal and water effected by the use of the Perkins system of boilers is something wonderful. Only 20 tons of coal were consumed by the *Anthracite* on the trip across, and 436 gallons of water. The Perkins system consists of a tubulous boiler, in which the steam is generated at an exceedingly high pressure. By means of a special system of engine this steam is used and reused over and over again. The boiler is constructed of horizontal tubes, welded up at each end. These horizontal tubes are connected by small vertical tubes, and the boiler is proved to 2,500 lbs. per square inch. In the engine there are three cylinders, of different diameters: 8-inch, 16-inch, and 23-inch diameter respectively, with 15-inch stroke. The smallest one is placed over that of medium size, and worked from the same piston rod. The engines are of 20 horse-power nominal, and 168 horse-power indicated. The high-pressure and medium cylinders are single acting, the low-pressure one being double acting.

The *Anthracite* intends to leave as soon as possible for New York, in order to give a practical exhibition to the engineers and others interested in such matters in the United States of the benefits and advantages of the Perkins system. The captain and officers of the little craft profess to be abundantly satisfied with the results of the voyage.

AN IMPROVED system of constructing and driving piles, lately introduced in London, seems to have proved quite successful. According to the *Engineer*, these piles, which are tubular, can be made of either cast or wrought iron, and the thickness of the metal can be proportioned to suit the varying circumstances of construction; the lower end of the pile is made solid and pointed, is generally of wrought iron and steel tipped; the piles are also formed in sections, screwed together by strong steel sockets or joint covers, which are barrel-shaped on the outside, in order to diminish friction when being driven. Instead of blows being delivered on the head of the pile, the driving force is expended just where it is needed, namely, at the point, and this result is attained by using an elongated cylindrical driving weight, which travels easily inside the tube; the weight is raised by means of ropes or rods, and is allowed to fall on the flat head of the solid point, the pile thus forming its own guide for the driving weight. The effect of each blow is to drag, rather than drive the pile down; the point is swelled, and of sufficient diameter to effect a clearance for the joint covers, which have to follow it down, the whole operation being one of entire simplicity.

CAPT. EADS' SHIP CANAL.—A late Washington dispatch says: Capt. Eads arrived here this morning, and after a conference with his friends has decided to continue the perfection of his arrangements for carrying out his great project of connecting the two oceans. From conversation with the members of the committees of both houses, he is satisfied that next December they will be ready to take definite action respecting this great enterprise. In the meantime the government will be in possession of more satisfactory information from the United States of Colombia, and will have doubtless succeeded in completing negotiations which will enable the government to extend such aid as may be necessary to insure the completion of the work. Capt. Eads goes from here to New York, where he will confer with a number of prominent capitalists, who are entirely willing to embark in the project, being satisfied that Capt. Eads' experience and great engineering skill is a sufficient guaranty that the work can be accomplished at a cost less than that asked for by his bill.

ECONOMICAL ENGINEERING IN THE ST. GOTTHARD TUNNEL.—Collado enumerates the following advantages from the use of his compressor: 1. A saving of more than 600,000 francs (\$120,000) in the simple purchase of compressors. 2. The reduction of the cost of buildings to about one-tenth of what would otherwise be required. 3. A ventilation so complete that the ventilating fan, which had been previously purchased, are entirely useless, and their whole cost might have been avoided.

USEFUL INFORMATION.

Dynamite for Removing Stumps.

A correspondent of an English agricultural journal gives the following account of his use of dynamite for removing stumps of trees felled in a park at Meantmore, Bucks, in order to improve the landscape and leave more room for the rest of the trees to develop themselves:

The only tools required are an earth auger, which is similar to an old-fashioned wood auger, two inches diameter at the bit end, about four ft. long, and fitted with a slightly hollowed shield or cap, which the man fits against his chest when boring (this is used for boring holes between the fangs), a crow-bar, a grafting and a stock ax. Suppose a large root is to be removed out of the ground: a bole is made with the earth auger between two of the strongest fangs; this is put in at an angle, so that the bottom of the hole is as near under the center of the root as is possible. The hole is then charged with a few cartridges of dynamite; according to the size and strength of the root; a primer cartridge, containing cap and fuse, is then inserted on the top of the charge, and the whole rammed down with loose earth by a wooden rammer. The end of the fuse is then lighted; this explodes the cap, and that in its turn the dynamite, and the whole mass is usually blown out, breaking the root into convenient pieces for loading up or burning. The fuse is cut off at sufficient length so as to allow the workmen to get out of danger, which is usually from 50 to 100 yards, according to the strength of the charge. After the charge has exploded, seldom anything remains but a large hole, much resembling the head of a boiler. I took particular notice that no damage whatever was done to the surrounding trees. We had nearly 400 roots got out by this process, and with two of our common laboring men, with one man sent by the agents of the dynamite company, we have been able to remove from 25 to 30 per day of roots averaging from a foot and a half to four ft. and a half in diameter. I find from careful calculations made that we have been enabled to remove the roots in a far more expeditious manner than hitherto, and at from 50% to 60% less cost. No one need be prevented from using dynamite on the score of its being dangerous, for with ordinary care it is, in my opinion, as safe to use as gunpowder.

SPONTANEOUS COMBUSTION.—Some experiments made at Riga with reference to the spontaneous combustion of various materials, wadding, raw flax, hemp, the waste of silk, wool and cotton spinning, also sponge, as well as the wood dust found in the cabinet-makers' shops, appear to demonstrate the important fact, among others, that small quantities really take fire sooner than large ones. The substances named were saturated with various fluids—oil, turpentine, petroleum, various varnishes, etc., all the fibrous materials took fire when saturated with any of these oils, or with mixtures of the same; sponge and wood dust, on the contrary, proved to be entirely harmless. Combustion ensued most rapidly with 17 grains of wadding and 67 grains of a strong oil varnish, namely in 37 minutes; while 200 grains of washed cotton waste, of which a portion was saturated with 750 grains of strong oil varnish, and the remainder wrapped about it, required a period of well-nigh 14 hours. On these materials being placed in a well-sheltered spot, and subjected to a heat of from 18° to 40° C., silk did not flame up, but slowly charred; and, as already mentioned, small quantities seemed to take fire sooner than large.

DUST FIRES.—A gentleman at Appleton, Wis., communicates to the *American Miller* his experience, which shows, as we all know, that other kinds of dust besides flour are explosive under certain conditions. He says: The loft of my spoke mill, in this city, was wholly used as a finishing room, where the spoke was finished, and polished by contact with rapidly revolving sanded belts. As it was a square or box stove, used for warming purposes. The light, fine dust would accumulate in every crack and crevice of the room, requiring cleaning off every day. One day some of this dust was seen to fall from a rafter upon some live coals that had accidentally got out upon the hearth of the stove. Instantly there was a flash that filled the whole loft, and it was on fire in a hundred different places. It was with the most active exertions that the fire was subdued, and not without a considerable damage to the building and stock. I believe the air was strongly impregnated with gas evolved by friction; and that the explosion and fire occurring in flour mills are precisely of the same nature and due to the same causes.

HOW TO TELL A HORSE'S AGE.—The editor of the *Southern Planter* says: The other day we met a gentleman from Alabama, who gave us a piece of information as to ascertaining the age of a horse after it has passed the ninth year, which was quite new to us, and will be, we are sure, to most of our readers. It is this: After the horse is nine years old a wrinkle comes in the eyelid, at the upper corner of the lower lid; and every year thereafter he has one well-defined wrinkle for each year of his age over nine. If, for instance, a horse has three wrinkles, he is 12; if four, 13. Add the number of wrinkles to nine and you will always get at it. So says the gentleman, and he is confident it will never fail.

HEATING CITIES BY STEAM.—The Boston *Journal of Commerce* is in favor of steam heating, and for these among many other reasons: "The cost of it, as compared with the present so-called system, is insignificant, being anywhere from one-twelfth to one-quarter. For power, it has been proved that it can furnish it from 25% to 50%—anything up to 25 or 50-horse—for what a man can keep his own engineer and furnish his own fuel for, and the steam is always ready, night or day. The gas companies, horse railroads, and the property owners—some of them—are always found to be ready to fight any innovation on their 'rights'; yet we presume the people of Boston, as well as of many other cities, will sooner or later come to this common-sense way of doing business. Baltimore is already putting in these works, and estimates and specifications are made for two other cities which we are aware of, and we hope sooner or later to see the conservative men of Boston take the matter up and make a business of it."

TO TEST MILK FOR WATER.—A German chemist furnishes a very simple procedure for testing the amount of water in milk, which can be applied by anyone. All that is required is a small quantity of gypsum (plaster of Paris), say one ounce. This is mixed with the milk to a stiff paste, and then allowed to stand. With a milk of 1.030 specific gravity, and a temperature of 60° Fahr., it will harden in 10 hours; if 25% of water is present already, in two hours; if 50%, in one and a half hours; and with 75%, in 30 minutes. Skimmed milk which has been standing for 24 hours, and is of 1.033 specific gravity, sets in four hours; with 50% of water, in one hour; and with 75%, in 30 minutes. Heat should not be applied, as then the use of the thermometer would be required. This test is certainly very simple and not costly.

IMPORTANT TO FISHERMEN.—The *Scientific American* says it is a well-known fact that fish always return to the same ground each year to spawn, but that it has recently been discovered that they always follow the left-hand side of the river on their trips to the spawning grounds, and returning take the right-hand side of the river. Our fishermen should remember this.

STRUCK BY LIGHTNING WHILE UNDER WATER. At Halifax, N. S., May 29th, while divers were at work at Cole Harbor dike a storm came upon them, and the lightning striking an air pump passed down to a diver under the water. When brought up he was insensible, but his injuries are not serious.

GOOD HEALTH.

Climate in Consumption.

Apropos of the journey from Cannes to St. Petersburg of the invalid Empress of Russia, who went home in mid-winter for fear of dying away from her family, a distinguished Vienna physician publishes a vigorous protest against the practice of sending consumptive patients to warm climates without regard to the stage of their disease or their circumstances. He has taken note of 50 cases of such patients, who have been sent by their physicians to spend a winter in Italy or Egypt, and among them all he found only three who received any benefit from the change, while many were positively injured. Much that he says is applicable to this country as to Europe. No doubt many of our physicians prescribe a winter sojourn in Florida or Nassau, to patients in advanced stages of lung complaint, without much consideration of possible effects upon them of an enervating atmosphere, the absence of home faces and home comforts, and the weariness and loneliness of a listless life among strangers. A warm winter climate is no doubt beneficial in the early stages of the disease, and in some instances may effect a cure; and in more advanced stages its influence may alleviate the sufferings of the patient and retard the progress of the fatal malady. But the wise physician should carefully consider whether the possible benefits will not be more than counterbalanced by the fatigues of the journey and the discomforts and home-sickness attendant upon life in hotels, away from family and friends. Every one who has visited our Southern winter resorts, has been moved at the spectacle of melancholy invalids hoping for some magical effect from the climate, which they never should have been led to expect. Consumed with *ennui*, and no society save that of other patients, these poor people watch the thermometer and the progress of their ailments, shivering with cold when the mercury approaches the freezing point, and bitterly regretting the snug Northern homes which many of them should never have left.—*Materia Medica*.

SANITARY ERRORS.—It is a popular error to think that the more a man eats the fatter and stronger he will become. To believe that the more hours children study the faster they learn. To conclude that if exercise is good, the more violent the more good is done. To imagine that whatever remedy causes one to feel immediately better is good for the system, without regard to the ulterior effects.

WEEPING.—The physical, mental and moral effects of weeping are dependent entirely upon "circumstances," and these "circumstances" are very comprehensive, as they relate to the organization, temperament, education, association, business, etc., of the individual.

THE PHOSPHATES IN FOOD.—Prof. Horsford says, in a recent paper, it is a familiar fact that some persons of a feeble digestive power prefer embrowned meats and toasted bread, to undone flesh and plain bread. The difference between them is mainly due to the effects which incipient burning has produced; and one of these effects is the more or less perfect separation of the phosphates from the organic radicals entering into the composition of the tissue. The ashes of wheat, rye, oats, Indian corn and barley, and of seeds in general, contain phosphoric acid. It also occurs in the ashes of most animal tissues other than bones or teeth. In some of them, as in fish meat, the phosphates are feebly combined. A mere soaking of a piece of codfish in water for a few moments will separate sufficient phosphoric acid to yield a ready reaction with the usual tests. Fish as an article of diet has been commended, because of the facility with which it may be digested, and because it has been supposed to be especially suited to supply nutriment to cerebral tissue. It has been suggested that the facility with which the phosphates may be disengaged from the complementary part of the fish tissues, is the explanation of both these peculiarities, and is some degree of the process of digestion as a whole. The emulsion, which results from the action of the ferment and mineral acid, like hydrochloric acid in artificial digestion, is to produce an acid phosphate. It is but reasonable to infer that the addition of the acid phosphate to food, or its administration as a medicine, will prove nutritious.—*Medical and Surgical Reporter*.

A HOT TERM.—July is a trying month for children, in which disorders of the digestive system are prevalent, which, in cities, are always due to bad food and bad air, and improper clothing. It gives us pain to see how the poor people who throng the tenement houses in cities feed themselves and their children during these months. Wagon loads of cucumbers are distributed, potatoes which are very far from being ripe, young veal, stale meats of different kinds, and swill milk, or milk that has been doctored with stale starch and water, provoke disease and defy all the laws of health. All persons who work in the open air under a blazing sun should have a ventilated hat. Straw, chip, generally furnish a fair amount of ventilation without a special effort; still we fancy that there should be more ventilation than the common tightly-sewed straw hat affords. Holes may be made in the common felt hat so the breeze may pass through and keep the head cool. It is a good plan to keep a few green leaves or small twigs in the hat when exposed to the direct rays of the sun. After working and perspiring, warm clothing should be assumed, so as to keep up a gentle perspiration, growing less and less till the body has reached its normal condition.

DRINKING ICE WATER.—There is no more doubt that drinking ice water arrests digestion than there is that a refrigerator would arrest perspiration. It drives from the stomach its natural heat, suspends the flow of gastric juice and shocks and weakens the delicate organs with which it comes in contact. As a writer on human diseases says habitual ice water drinkers are usually very flabby about the region of the stomach. They complain that their food lies heavy on that patient organ. They taste their dinner for hours after it is bolted. They cultivate the use of stimulants to aid digestion. If they are intelligent they read upon food and what the physiologist has to say about it—how long it would take cabbage and pork and beef and potatoes and other meats and esculents to go through the process of assimilation. They roar at new bread, hot cakes and fried meat, imagining these to be the cause of their maladies. But the ice water goes down all the same, and finally friends are called in to take a farewell look at one whom a mysterious Providence has called to a clime where, as far as is known, ice water is not used. The number of immortal beings who go hence, to return, on account of an injudicious use of ice water, can hardly be estimated.—*Baltimore Sun*.

MEDICINAL PLANTS IN CALIFORNIA.—When the first Americans came to these shores they found that the Spanish and Mexicans were in the habit of depending largely, in case of sickness, upon simple extracts of native shrubs, herbs and roots. Some of the cures they performed bordered on the marvelous, and a knowledge of Yerba Santa, Yerba Langrado, Cascara Segrada, and a number of other medicinal plants, soon extended to the Americans, and found a place in the *Materia Medica* of civilized countries. The lists of leading druggists now contain regular quotations of several species, and shipments from this coast are increasing. The business, so far, is done by contract, Eastern firms, or parties on this coast, letting contracts to persons to furnish a given amount at a fixed price, there being as yet no sale in open market for these products. The price is, contractors say, very fluctuating. *Griodelia* robusta grows near the coast, in blackish macsee, and is not very plentiful; *Grindelia* squarrosa grows on the uplands and great valleys, where it is called tar-weed by some, and is troublesome in the fields. *Cascara Segrada* grows on hillsides and uplands in great thickets.—*California Horticulturist*.



W. B. EWER.....SENIOR EDITOR.

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The Week.

Since our last issue we have to note the continuance of seasonable and wholesome weather, which is especially favorable to farmers and orchardists. The apprehension which had been felt by some that the injury to the wheat crop was more general than had been reported, has fortunately been completely dispelled by the good news from the harvest fields, and there is now assurance of a fair yield of marketable wheat. The increased area will undoubtedly give an average crop of grain.

During the week the national holiday, which this year fell on Sunday, was celebrated in this city in a spirit of fine enthusiasm. The procession, of which the military was the conspicuous feature, was excellent. Beyond the inevitable fires—one of which near midnight was marked by serious injury to several firemen—nothing occurred to mar the festivity of the pleasant day.

No noteworthy incident has occurred on the Comstock since our last publication, though work continues to be carried on in a large and systematic manner. All the mining counties in this State continue their activity, and send encouraging reports of improvements and discoveries. The discovery of a deposit of remarkably rich gravel in Nevada county, an account of which is given in another column, will do much to promote prospecting and work in sections where gravel beds are supposed or known to occur.

Business in the city has been less active, owing to the fact that this is the vacation season, and business and professional men seek the sea-side, mountain and valley, for a few weeks' relaxation and recreation.

Great Need of Penitentiary Reform.

The shocking condition of the penitentiary system of California has been often exposed to the public attention by the press, and occasionally by some thoughtful philanthropist. It has been shown times and again that the utter lack of system and the entire want of discipline in our penitentiary had fatally perverted and defeated the objects of its institution. Thus far the matter has been unheeded. It would appear that not even the practical sense of the tax-payer had been aroused to the potent evil. That our citizens can sit apathetically in the presence of such a monstrous perversion of this clear intent of the penal institutions of the State is indeed remarkable. Sensible, hard-headed men, who directly pay the swelling taxes, do not apparently give the subject a random thought, or, if they do, are satisfied by indulging in a little querulous grumbling. This is a grave mistake, whether considered on the score of humanity or economy. It has been remarked that to spare deserved and just punishment is to encourage iniquity. There is small cause for wonder that our prisons are full to overflowing, and that there is a constant cry for more room and more cells, when the certainty that the punishment will be merely nominal, the restraint barely irksome, and the food and lodging substantial and comfortable, tempts the knave and the ruffian to risk the violation of the law.

How utterly had our penitentiary system is—a system which has been fitly characterized as a sort of "criminal university"—has been lately shown with painful clearness by no less an authority than a member of our judiciary. Judge Freelon, of the Superior Court, presided at the trial of the San Quentin murder case, in which both the slayer and the slain were convicts, and in the course of the trial the inner life of the prison was laid bare. Its enormities so impressed the Judge, who has been on the bench for years, that he deemed it to be his duty to give emphatic utterance to some of the thoughts which the history of the case suggested.

"Our State penitentiary does not," he remarks, "accomplish any one of the ends for which it is supposed prisons are built and maintained. First, it does not reform, or tend to reform. Just the contrary. The prison is a school of vice of every degree, the most debased and dangerous. There is a hierarchy of crime there, and the man who has committed, is committing, or plotting to commit, the most and the worst crimes, is the most admired and respected. The man who has some good instincts left is left out of fashionable prison society. The man or boy who gets there through some accident or misfortune soon learns that to be respectable is to be bad, and if he really be not bad by nature he must affect to be so. Again, this prison is no punishment for the professional criminal class. They are, as respects food, society, lodging, dress and amusement, much better off than they are hunting a living on the Barbary Coast. This is a little world of itself, has its own code of morals and manners, and the prisoners seem proud of the number of terms they have served." And such a flagitious system cannot be other than productive of evil. Judge Freelon concludes his terrible analysis by expressing the opinion that "the State should provide for a better classification of prisoners, for more enforced labor and more solitary confinement, so that even professional criminals would look at imprisonment as being some punishment, and consequently something tending to deter them from the commission of new crimes."

These are grave matters for the consideration of all good citizens—for the heads of families and the holders of property, and all the well-wishers of the State. The penitentiary at San Quentin is a standing menace to life and property; a perpetual danger to the young and inexperienced. It is doubtful if all the reeking slums of our cities produce criminals so rapidly and so fully equipped for vice as our State Penitentiary. But hitherto the glaring evils of the institution—than which the Sacramento Record-Union declares "no worse prison can be found probably on the earth"—have been exposed in vain. The supreme necessity for immediate and radical reform has been repeatedly made apparent; but it would appear that prison reform and prison discipline have come to be regarded in this State as sentimental absurdities. Other States have for years by intelligent legislation and faithful supervision, aided by private associations for promoting prison reform and discipline, sought to introduce the largest reform in their penal methods; and their efforts have achieved results that are cheering both to the humanitarian and the economist. They have shown that they could curb the vicious and induce some of them to reform; and that it was cheaper to do so than to permit the criminal class to grow in size and efficiency and to build costly prisons for their temporary withdrawal and accommodation. We cannot too soon or too faithfully act on the suggestion of Judge Freelon and make at least an attempt to establish a scientific system of classification and discipline for the government of our State penitentiary—a system that shall be at once certain and rigid and yet humane. Such a rigorous system, in which there should be no senseless cruelty, would constantly exercise a wholesome restraint and gradually lead to the reform now and then of a convict.

Ore Crushing.—No. 2.

[Written for the Press by J. RICHARDS.]

It is to be regretted that no careful experiments have been made and tabulated, as to this effect of different kinds of stamps on the various kinds of stone, so that constant performance could be fixed with some certainty. The results in different mills has, of course, been recorded, but the conditions vary in the different cases, and especially is there no fixed data as to the difference between wet and dry stamping.

The vastness of the mining interest both present and prospective on this coast warrants careful investigation in respect to pulverizing processes, because it is in this direction that invention seems most active; while, as pointed out in the previous article, the mechanism for pulverizing is no doubt the most perfect part of a modern plant.

The true object of search should be not for machinery to crush or pulverize faster, but to attain conditions which will permit the machinery now in use to work up to its full capacity.

There is no doubt that mineral stone of all kinds, whether hard or soft, is more friable and may be crushed at less expense when dry, yet the product of dry stamping is on an average one-third less than by the wet process. All experienced men will agree that this difference is not due to the stamp action, but to what may be called working conditions.

If some common quartz is placed in a chemist's mortar and pulverized for experiment, it will be found that up to a certain point the operation will be most rapid when the stone is dry. After this the conditions will change, pulverizing will become slow and difficult, but if water is added the effect will at once be increased, and the finishing process down to the fineness required will be comparatively easy. A stamp battery is only an enlarged mortar and pestles, and all facts thus far gathered point to a similar result in experiments made in quartz mills. All will agree that stone is more easily broken to a certain degree of fineness when dry; then the unfinished particles become enveloped in fine dust, which acts as an elastic cushion, absorbing the force of the stamps, and also preventing circulation, so the coarser particles may find their way beneath the stamps.

Improvement in manufacturing or mechanical operations of all kinds is derived from two sources, namely: inductive conclusions and experiment. The first suggests the latter, and if the two are properly combined they cannot fail to attain the best results. Experiment not guided by inference is an expensive and generally an uncertain course. Inference without experiment is still more uncertain. The two things must go together.

I propose to apply some inductive conclusions in these ore-stamping processes, and see if by that method the difference between the wet and dry operation are not fully borne out by the working conditions.

In the previous article reasons have been presented why the percussive, or stamp process, is better than any other. Leaving this, therefore, in so far as mechanism for pulverizing and treating of the conditions of stamp operation, we find certain requirements as follows:

1. Theremoval of particles from the stamps as soon as fine enough.
2. The separation of such particles from the coarser ones that require further treatment.
3. The removal of the finished pulp or sand from the battery.
4. Suspension so as to permit precipitation.

So far as crushing or pulverizing, these are what may be called the "ideal conditions," which, if perfectly attained, would permit the highest possible efficiency of stamps.

Beyond the batteries there are other requirements, that may be summarized as follows, for the common gold amalgamating processes: 1. The conveyance of pulp or sand for subsequent treatment. 2. Agitation to secure exposure of particles. 3. Maintaining mobility between particles, also to secure exposure. These have, however, to do only with mercurial extraction, and need not be considered in connection with pulverizing.

The purpose is to compare water in wet crushing with air in dry crushing, and determine as far as possible by inference how nearly the first named conditions or requirements can be filled in the two cases.

Before entering upon such a comparison it will be necessary to offer some explanation of the proposed method of employing air in dry crushing. Thus far it seems the application of air has only been in drawing off the dust from batteries—that is, removing what is in suspension, or thrown up by agitation and caught in weak currents.

There are insuperable difficulties in constructing air ducts and nozzles so as to catch the dust near to stamps; in fact, no such nozzle can be arranged so as to catch more than the flying dust, or what may be thrown into or near them by agitation. The strength of an induced air current in a battery is, theoretically, as the area of a plane through the battery compared to the area of the induction orifices, a difference too great for comparison, unless the volume of air passed through was so great that the expense for power and maintenance of pneumatic apparatus would more than equal any gain that could be expected in pulverizing. Fans and all kinds of pneumatic apparatus run heavily, and when moving on a low pressure are deceptive, generally consuming several times as much power as

is commonly supposed; hence, one of the first requirements in employing air as a separating and conveying medium is to have the pipes and nozzles small—only large enough to carry off freely the amount of material the stamps can prepare. It is probable that in all the experiments hitherto made, this principle has been lost sight of. The methods of collecting have rendered it necessary to employ large fans and larger quantities of air.

The crushing area of stamps rarely exceeds 50 inches. The operation is a concentrated one in this respect, and if this dust could be gathered at the point of crushing and a strong air current forced between the shoes and dies each time the stamps are raised, such a current could be small.

To secure this end there seems to be but one way, to draw the dust up through the top die or shoe by means of a central bore or duct of small diameter as possible.

In some plans now completed for a stamp mill, with dies 10 inches in diameter, the air aperture is made three inches in diameter. This, it is thought, will be ample, and perhaps in excess of what is required; at any rate, a current of air thus applied directly when the crushing is done, drawing to the center, may be quite small in comparison with what would be required if its course and action was not so complete.

The application of any effectual means for removing the dust in dry stamping, will, I believe, lead to important changes in the construction of batteries and stamps, and that the highest effect in dry crushing will be gained by heavier stamps falling a less distance and having a positive rotation, the latter not in a degree, nor in a manner to cause extra abrasive wear, but with such limit as to time as might be spared. One-third of a revolution, or perhaps less, while the stamps run down, would be enough. The effect of such rotation would of course be dependent upon the weight of the stamps. There is no gain, or, at least, but little, in the rotation of stamps within what may be called a crushing height, and I strongly incline to the opinion that the rotation of ordinary stamps by the cam motion, while it serves important mechanical ends, has but little to do with the working effect.

In the case of stamps having a positive rotation, as in the "Kendal machines," there is no doubt that the removal of the "neutral axis" in the dies will improve their action, so the central bore for air would be no objection. The same may be said of the strength of dies and shoes, especially if made of molded steel. A central bore would greatly increase their strength and insure greater homogeneity, which at present is the main difficulty in preparing them.

THE COLLISION ON THE SOUND.—One of the theories of the cause of the fatal collision of the steamers *Narragansett* and *Stonington* on Long Island sound recently, is that the meaning of one of the prescribed signals was misunderstood. The provision of law is that when two vessels are approaching each other each shall pass to the right, giving as a signal that they will take that course one blast of the whistle; and if, for any cause, either shall desire to pass to the left, it must signal by two short blasts in quick succession. The inspectors have received information that the *Narragansett*, when in the fog at the time of the disaster, blew her whistle continuously at intervals of half a minute, and that this prescribed fog signal was mistaken by the *Stonington* to mean that the *Narragansett*, which could not be seen at the time, meant to her left. If these statements are true they will explain in part the cause of the fatal blunder. Referring to this disaster, the New York *Mail* makes these pertinent suggestions: "The crash of the *Stonington* and *Narragansett* was followed by an outburst of flames which forced the bewildered passengers into the water almost without time to secure life-preservers. Had there been no fire the passengers could have been removed in the life-boats and there might have been no loss of life. The fire was caused by gas. Is gas a safe illuminator for passenger vessels? That question is worth consideration by travelers and by owners of steamboats. Let the latter inquire whether it is not possible to adopt a generator which will both furnish their vessels with electric headlights, and illuminate the cabins with a light which will be perfectly safe."

CALIFORNIA MEAT PRODUCTS.—All meat producers will be glad to hear of steps of progress in the introduction of our meat products into new channels of consumption. The *Commercial Herald* has the following item of trade news: The Russian government has just concluded a contract with Merry, Faulk & Co., of this city, for a round lot of beef, say, 2,250 hbls. or 450,000 lbs. of mess beef, which is the largest contract of the kind ever made on this coast. The meat, barrels and salt used in filling the contract are all of California production. A sale is also reported by the same parties, for U. S. Army supplies, of 50 hbls. mess pork at \$20.25 per hbl., and 15,000 lbs. extra clear bacon, in cases of 200 lbs. each, at \$11.60 per cwt. This is certainly a pleasant feature. For years we have maintained that we could supply the Government with beef and pork of better quality and upon more advantageous terms than it could be purchased for at the East, and sent to this coast via Cape Horn. The percentage of loss by sea through the tropics is always large, and now by experience it is found that our own Government, as well as that of Russia, find it for their interest to purchase their meats in California.

Signal Service Weather Case.

The extension of the U. S. Signal Service has proved of great value to all our outdoor industries. The great trouble in bringing its results to bear upon agriculture has been the difficulty of making known forecasts, etc., to those remote from the cities or large towns. Gen. Myer, Chief of the Service, now has it in mind to issue a compact arrangement of meteorological devices so that those distant from centers of information may have some means for arriving at better judgments of coming weather than they now have. Of course it is not pretended that any device will give infallible forecasts, but this design is to bring the best modern means of judging within the reach of all, that the benefits of the government service may be widely disseminated.

Our engraving on this page represents the "weather case or farmers' weather indicator," which will be set up so long in rural postoffices throughout the country. The case is 31 inches high, 13½ inches wide and 4½ inches thick. The front is covered with a glass door, which is kept closed except when making observations and adjusting the different instruments. The engraving, which of course presents the weather case in miniature, is worthy of careful study and a leisure hour will be required to arrive at a full understanding of its plan and details. We shall give as full a description of the different parts and their uses as we have space for at this time, as we deem this subject one of general importance. We understand that the cases are not for sale, but are to be erected here and there at government expense for the public benefit.

The pointer or index at the top of the case (No. 1) slides on the brass arc; it is known as the "sunset barometer index," and indicates, when set, by the figures to which it points on this "main barometer scale," which is just below it, the reading of the barometer at the time of the sunset yesterday. The "main barometer scale" (No. 2) exhibits all the barometric readings likely to be used with this instrument. The pointer (No. 3) just below the "main barometer scale" is called the "reference index," and indicates by the figures to which it points on the main barometer scale, when the instrument is set, the mean or average reading of the barometer at the place at which the instrument is set and for each separate month. When the barometer reads above or below this reading at any place, such reading is said to be "above the mean" or "below the mean" for that place in that month. This reference index is established in the exact central line of the face of the case. The long brass hand over the glass face of the barometer is known as the "long pointer," and indicates, by the figures of the "main barometer scale" to which it points when set, the reading of the barometer when last set. The black pointer on the face of the barometer under the glass face is known as the "short pointer," and indicates the existing pressure of the atmosphere at any time the instrument may be examined.

There are for each place and each month two kinds of winds: First—Winds which, blowing from certain directions, are at that place and in that month more likely than other winds to be followed by rain. These are called "rain winds." Second—Winds which, blowing from certain directions, are at that place and in that month less likely than other winds to be followed by rain. These are called "dry winds." The wind direction for any day or time must be seen and taken at each place or station by a vane as well located as practicable. The "wind disk" (No. 8) consists of a brass circle, on which slide freely two arcs—a red arc, called the "dry wind arc" (No. 9), and a blue arc, called the "rain wind arc" (No. 11). In the center of the disk is a pointer turning with a turning-screw, and called the "wind disk pointer" (No. 10). Around the disk are letters to show directions, as N. for north, E. for east, NE. for northeast, etc.

The pointer and scale (No. 5) on the right of and below the barometer are called the dry-wind time record, and the pointer (No. 7) is called the "record pointer," and indicates, when set, the length of time the wind has been blowing continuously from a "dry" direction, by the figures showing the number of hours on the scale to which it points.

The pointer and scale (No. 4) on the left of and below the barometer are called the rain-wind time record, and the record pointer (No. 6) indicates, when set, the length of time the wind has been blowing continuously from a "rain" direction, by the figures showing the number of hours on the scale to which it points.

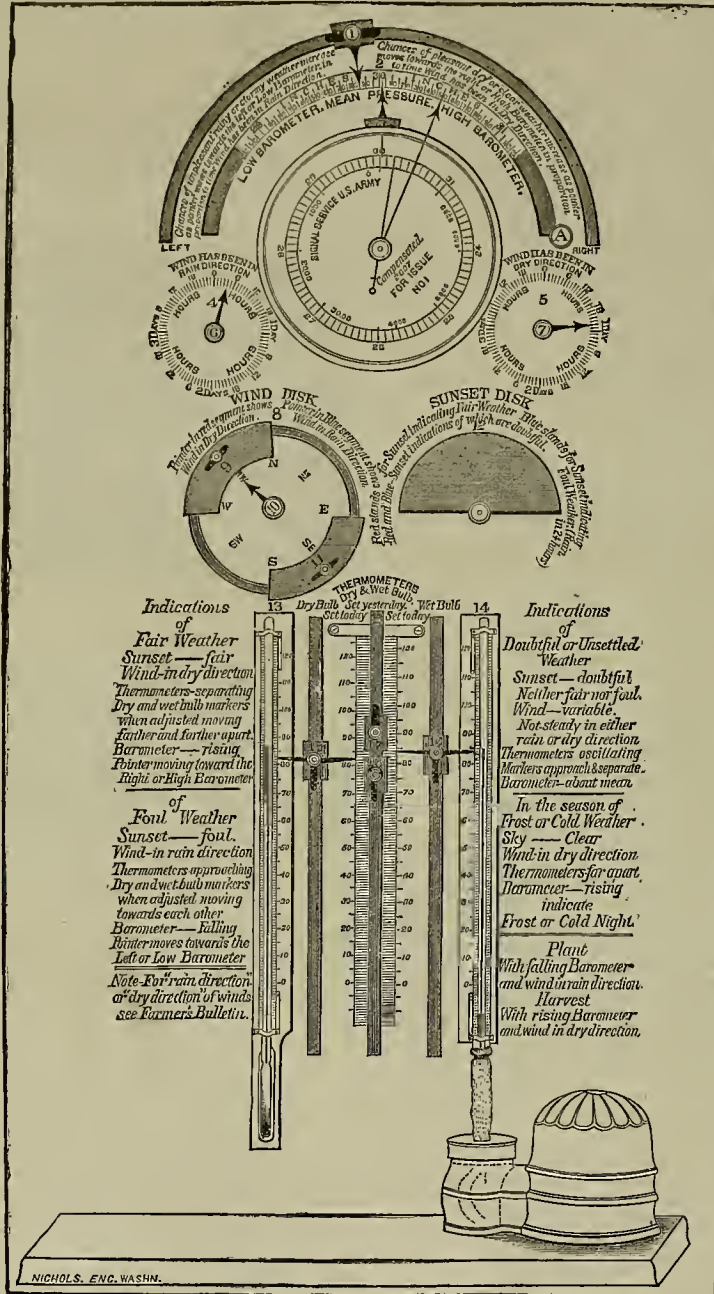
The record pointer on the rain-wind time record (No. 6) is always turned by the thumb-screw, and set pointing at the figure 0 on the scale when the wind is not blowing in the rain-wind direction. In the same way the "record pointer" on the dry-wind time record (No. 7) is always set pointing at the figure 0 when the wind is not blowing in the dry direction.

The sunset disk (No. 12) consists of a circular disk one-half of which is colored red and one-half of which is colored blue. The disk turns upon a central turning screw in such a manner that half of the disk shows through a semi-circular opening in the face of the weather case. The sunset disk is set as follows: At the exact time of every sunset the western sky and the character of the sunset is carefully observed. The examination ought to be minute and careful, lasting for about fifteen minutes. If the sunset sky is clear or red, or markedly what is known as a "fair weather sunset"—a sunset

such as is generally held to indicate a clear or fair day to follow on the next day—a day on which it will not rain—the sunset disk is turned by the turning screw until the semi-circular opening shows all red. The sunset disk, thus turned, is described as set for a "fair weather sunset."

If the sunset sky (the western) is cloudy or foul, or markedly what is known as a "foul weather sunset," a sunset such as is generally held to indicate foul weather to follow on the next day—a day on which it will rain—the sunset disk is turned by the turning screw until the semi-circular opening shows all blue. The sunset disk thus turned is described as set for a "foul weather sunset." If the appearance of the western sky and the character of the sunset are neither markedly those of a "fair weather sunset" or of a "foul weather sunset," but such as to leave the observer in doubt how to style it, the sunset disk is turned to show half red and half blue, or "doubtful." The sunset disk,

slides on the brass slide (No. 16). In the center of the case is the "dry and wet bulb scale," marked on the paper on which is the central brass slide bar (No. 19), and on this slide move the dry bulb keeper (No. 17) and the wet bulb keeper (No. 18). To set the thermometers examine first the dry bulb thermometer and move the "dry bulb pointer" (No. 15) on the slide until the outside point is exactly level with the top of the mercury in the thermometer—as near to it as practicable. Examine next the wet bulb thermometer, and move the wet bulb pointer (No. 16) on the slide until the outside pointer is exactly level with the top of the mercury in the wet bulb thermometer, or as near to it as practicable, then turn the dry and wet bulb scale, and on the "central brass slide bar" (No. 19) move one of the keepers until it touches as nearly as possible—is on an exact level with the inside pointer of the "dry bulb pointer," then move the other keeper until it touches, as nearly as practicable—is on an



A WEATHER INDICATOR.

thus set, is described as set for a "doubtful weather sunset."

In the lower part of the weather case there are two thermometers, a dry bulb thermometer (No. 13) on the left hand side of the case, and a wet bulb thermometer (No. 14) on the right hand side. The dry bulb thermometer is like any other thermometer, and shows by its readings the temperature of the air. The wet bulb thermometer is one, the bulb of which is kept constantly moist by the water passing up from the glass reservoir, through the wicking which covers the thermometer bulb. The readings of the dry bulb thermometer and those of the wet bulb thermometer are more and more unlike, or farther and farther "apart," as it is called, in proportion as the air contains less and less moisture, that is, is becoming drier. The readings of the dry bulb thermometer and those of the wet bulb thermometer become more and more alike—are nearer and nearer together—in proportion as the air contains more and more moisture. That is, is becoming saturated or wet.

By the side of the dry bulb thermometer (No. 13) is the dry bulb pointer which slides on the brass slide (No. 15). By the side of the wet bulb thermometer is the wet bulb pointer which

exact level with the inside pointer of the "wet bulb pointer." The thermometers are now set and the difference between their readings can be known by counting on the "dry and wet bulb scale" the number of degrees between the keepers.

When the thermometers are examined and set again, following the same plan, it will be easily seen whether the "keepers" are, when set, farther apart than they were at the previous setting, or whether they are, when set, nearer together than at the previous setting.

If they are further apart, the thermometers are said to be "separating"; if they are nearer together, the thermometers are said to be "approaching." Other things being equal, the thermometers show, when they are "separating," that the air is becoming more dry, one sign of approaching fair weather. The thermometers show, when they are "approaching," that the air is becoming more moist or damp, one sign of approaching rain.

The weather case is not intended to be used independently of the official weather reports. It is to be used always in connection with them. The weather case is for the purpose of supplementing the official reports by showing the local instrumental indications and giving other

information. It is intended especially for use at farmers' postoffices and places reached with difficulty by the printed reports. It will supplement often whatever knowledge there be of local signs, with the indications of the instrument. Its careful use, taken either with the furnished reports or even without them (if they chance to fail) will often enable the character of the coming weather on the coming day to be so judged as to determine what kind of work or undertaking it is wise to plan for or to omit. The case gives the local instrumental indications, and will frequently aid in making fair forecasts for the next day.

CIRCLING THE NORTH POLE.—Lieut. Weyprecht's proposition for a circle of observing stations around the north pole region, is about to be practically carried out, says *Nature*. The Danish government has resolved to establish a station at Upernivik, in west Greenland; the Russian government has granted a subsidy for an observatory at the mouth of the Lena, and another on the new Siberian islands; Count Wilczek will defray the expenses of a station on Nova Zembla under the direction of Lieut. Weyprecht; the U. S. Signal Service Bureau, under Gen. Myer, has received permission to plant an observatory at Point Barrow, in Alaska; and it is expected that Canada will have a similar establishment on some point of her Arctic coast. At the Hamburg Conference it was announced that Holland would furnish the funds for a station in Spitzbergen; and it is expected that Norway will have an observing post on the extremity of the Provinces of Finnmark. This is a good beginning, and it is hoped that some sort of agreement will be established to have all the observations made after a uniform method, otherwise their value will be greatly decreased.

TERRIFIC EXPLOSION OF GAS.—In London, on the evening of the 6th inst., a terrific explosion of gas occurred in the vicinity of Tottenham Court road. For a long time it had been noticed that there was a large and constant escape of gas, and finally a workman was sent to examine the pipes. He applied a light to the point where pipes joined, and immediately there was a series of explosions, at least six, each causing a deep trench from 3 to 10 yards long. From one of these trenches 16 persons were extricated. Two persons were killed, two fatally wounded and some 30 more or less injured. One house was demolished and over 400 injured. Along the line of the explosion all the window glass was broken and the chimney pots thrown down. Dense volumes of gas issued from the trenches, and the air was suffocating. Buildings and streets in the neighborhood were enveloped in total darkness. An eye-witness says that at the moment of the explosion he noticed a mass of bricks and stones shoot up about 100 ft., followed by a loud report which rolled down the street like artillery fire. The workman who applied the light in search of the leak was blown a great distance and killed.

THE FORESTRY INVESTIGATORS.—We have had the pleasure of meeting Prof. C. S. Sargent, of Harvard University, and Drs. Engelmann and Parry, his associates, who are now on our coast in pursuit of knowledge concerning our forest resources and lumbering interest, for use in the census reports of 1880. We have made several allusions to the special work in which these able botanists are engaged. They will betake themselves at once to the forests of the north coast, and on their return will make special studies of California and Arizona forests and influences affecting them. We trust they may be speeded in their work by all our people with whom they may come in contact. Great interest will await the reports of their investigations, which will come ere long, and form one of the most valuable features of what promises to be the best census ever taken in this country.

CALIFORNIA TREE IN AUSTRALIA.—An article in the Melbourne *Times* gives notes of the growth of a California tree in the Melbourne botanic garden. We read that a fine specimen of our redwood may be seen towering up far above the roof of the hush sheds in the propagating department. This specimen is about 55 ft. in height, the circumference of stem at the base being 7 ft. 5 in. It has made rapid growth during the past four or five years, and is supposed to have been planted by Mr. John Dal-lachy when curator of the gardens, some 25 years ago.

AT THE GEYSERS.—From a party that visited the Geysers from Anderson Springs we learn that 160 persons were there on the Fourth, the largest collection of visitors ever known there. A large number of bathers and spectators were at the warm swimming baths in the forenoon. The road from Anderson Springs to the Geysers, some nine miles, is a wild and picturesque route.

HANDBOOK FOR MICROSCOPISTS.—We have received from the Industrial Publication Co., New York, a copy of the Microscopists' Annual for 1879. This useful little handbook contains tables, rules and memoranda; a list of microscopical societies and their officers; and a directory of the principal makers, dealers and importers of microscopes in Europe and America; and is apparently indispensable to all who have occasion to use the microscope.

Horticultural Exhibits at the Mechanics' Fair.

The managers of the fifteenth industrial exhibition of the Mechanics' Institute have placed the Horticultural Department of the exhibition under the charge of the California State Horticultural Society. At the meeting of June 25th the Horticultural Society formally accepted the trust and unanimously adopted a resolution, pledging the members to earnest efforts to make the exhibition worthy of our State, and, so far as possible, representative of our grand horticultural interests.

The society invites every plant and fruit grower in the State to prepare at once to transmit the best specimens of flowering and foliage plants and fruits for exhibition at the fair, which will open in the spacious pavilion of the Mechanics' Institute, in this city, August 10th, and continue for five weeks.

The competition for the liberal premiums will be offered to growers only, and each producer is invited to compete, whether it be for a single award or for several. The aim of the society is to draw out the very best that the State can produce in the articles named. The popular interest is now turning strongly toward development of our horticultural resources, and all exhibitors of choice growths will not only do themselves credit, but will make known the possibilities of their regions, and of the State in general.

The exhibition will be wholly in charge of the Horticultural Society, and the appointment of judges will be made with reference to their especial fitness for examination of exhibits entrusted to them. The premiums will be awarded by the Mechanics' Institute upon the recommendation of the society's committees. The greatest care will be taken in the arrangement of specimens, that their excellence may be recognized.

All professional and amateur horticulturists in the State are invited to do what they can to make this year's exhibit comprehensive and representative. Great care should be taken in selecting, plucking, wrapping and packing choice specimens, and all varieties must be correctly named. As the fair will be open for five weeks, each sample should be sent just as it approaches its best estate, and thus all varieties may be shown in their prime and all parts of the State, both early and late, can be represented by the fruits which mature during the progress of the fair.

Special attention will be given to the proper display of new fruits, both California seedlings or those lately secured by importation, so that the progress made in these directions may be generally understood.

All exhibits should be shipped to "Horticultural Exhibit," Mechanics' Fair, San Francisco, Cal. All intending exhibitors are requested to announce at once what exhibits they expect to make to the Secretary, E. J. Wickson, 414 Clay street, San Francisco.

PACIFIC COAST MONEY ORDER OFFICES.—The following postoffices on this coast will be made money-order offices after the first Monday of next August, provided the respective postmasters furnish the necessary additional bonds: California—West Berkeley, Alameda Co.; San Mateo, San Mateo Co.; Calistoga, Napa Co.; Tomales, Marin Co.; Lompoc, Santa Barbara Co.; Aden, Modoc Co.; Willows and Arhuckle, Colusa Co.; Redding, Shasta Co.; Fort Jones, Siskiyou Co.; Loyalton, Sierra Co.; Boca, Nevada Co.; Orange, Los Angeles Co.; Turlock, Stanislaus Co. Nevada—Camp Halleck, Elko Co. Oregon—North Yamhill and Dayton, Yamhill Co.; East Portland, Multnomah Co.; Centerville, Umatilla Co.; Hillsboro, Washington Co.; Independence, Polk Co. Washington Territory—Spokane Falls, Stevens Co.; Golden Dale, Klukitak Co.

CALIFORNIA LAND DECISION.—The Commissioner of the General Land Office rendered a decision, June 24th, in the case of the Rancho San Jacinto Nuevo, in San Diego county, rejecting the Thompson survey of 1876, and instructing the Surveyor-General to make a new survey, to comprise 11 square leagues, or about 49,000 acres, within the exterior boundaries. The preliminary survey has been approved, and a patent will shortly be issued by the General Office for the Rancho Los Palas Verdas, comprising 12,000 acres, in Los Angeles county, confirmed to Juan Sepulveda and Jose Loreto.

In the Head Center mine, Tombstone, the ledge has been tapped at the 300 level, which shows rich in face gold and horn silver. In Contention the ledge has been cut at the 312 level, with good ore also running northeast. On the 162 level a rich body of chloride has been struck.

The Gold Stripe mine in Plumas county, Cal., is again producing ore in sufficient quantity to justify the starting of the 24-stamp mill, which was set in operation a few weeks ago. It is said that a new body of ore has been discovered.

Change in Land Laws.

The new regulations set forth in the following letter from the General Land Office at Washington, are now in force.

To District Land Offices—GENTLEMEN:—Appended hereto is a copy of the act approved May 14, 1880, which changes existing laws and regulations relative to the entry of certain classes of land:

SEC. 1. That when a pre-emption, homestead or timber culture claimant shall file a written relinquishment of his claim in the local land office, the land covered by such claim shall be held as open to settlement and entry without further action on the part of the Commissioner of the General Land Office.

This will be held to apply only to the relinquishments which are filed subsequent to date of said act, viz: May 14, 1880.

You are instructed not to accept or act upon any relinquishment, unless made before you, which has been duly subscribed by the claimant on the back of his duplicate receipt, acknowledged, witnessed and executed in a manner which under the laws of the State or Territory in which the land is situated would be sufficient as a valid transfer of real estate. In case of the loss of a duplicate receipt or declaratory statement, an affidavit of such loss must accompany the written relinquishment.

Immediately upon a relinquishment duly executed as above, being received at your office, you will proceed as follows:

1. The Register will note on the relinquishment over his signature, the day and hour of its receipt by you.

2. Write the words "cancelled by relinquishment" (giving date), opposite the record of the entry in the tract book, the register of entries and the register of receipts.

3. Draw a line over the numbers of the entry on the township plat.

4. On Monday of each week you are directed to transmit to this office all the relinquishments which have been accepted by you during the preceding week.

When the relinquishment shall have been received and noted as above, you will hold the land embraced in the relinquished entry as subject to settlement or entry by the first legal claimant; the intention of said section, as understood by me, being only to prevent the delay resulting heretofore from awaiting action on such relinquishment by this office.

SEC. 2 is designed to secure to the contestant therein named, for the period of 30 days from notice of the cancellation of a prior entry of the character specified, a preference right to initiate his claim to the same land. It is not intended to grant such contestants the unconditional right to final entry, as I construe the section as preceding settlement or entry by any other party during the period named.

SEC. 3 places homestead settlers on unsurveyed public lands on the same footing with pre-emption settlers under existing laws. This section protects the claim of an actual settler upon unsurveyed land, provided he shall make homestead entry of the land within three months from the filing of the township plat of survey in the district land office, the same as the pre-emptor is now protected by filing his declaratory statement within the same period, and if the homestead settler shall fully comply with the law as to continuous residence and cultivation his statement defeats all claims intervening between its date and the date of filing his homestead application. In making final proof his five years' residence and cultivation will commence from date of actual settlement.—C. W. HOLCOMB, Acting Commissioner.

A Grand World's Fair in New York.

For two years a constant agitation has been kept up in New York for the holding of an international exhibition in this country in 1883. The dwellers in towns remote have, during this period, heard but little of the labors of the handful of public-spirited men who have persistently carried forward the movement to the point it has now reached. Patiently and prudently they have gone on from stage to stage, having the satisfaction at each successive step to witness a decided advance in all the essential elements of success. The holding of an international exhibition in this country in 1883 is now an assured fact. The initiatory difficulties inseparably connected with a scheme of such magnitude, particularly those in regard to the obtaining of necessary legislation, have all been overcome, and the preliminary arrangements and complete organization of the United States International Exhibition Commission of 1883 are being pushed forward to a speedy completion. A special act of Congress providing for the holding of such exhibition has been obtained; bills have been passed in the New York Legislature granting to the Commissioners who may be appointed powers to acquire such lands, etc., as may be requisite, and the Governors of the several States are rapidly nominating Commissioners to assist the project to a successful termination. The plan of the proposed exposition is on a scale of such magnitude that it completely eclipses everything of the kind in the past, and may probably never be surpassed in the future, and the movement has now entered upon a career of popular recognition and public favor which guarantee the ultimate accomplishment of all its projectors have hoped to realize.

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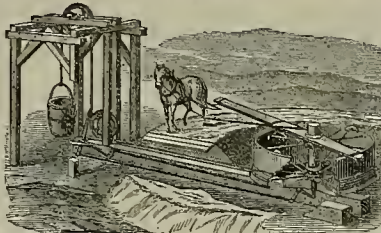
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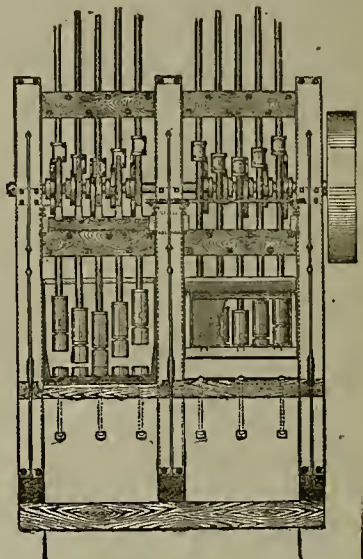
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING JUNE 20TH, 1880.

229,383.—GUN-LOCK—W. N. Crabtree, Porterville, Cal.
229,387.—ORE CRUSHER—J. T. Davis, S. F.
229,463.—AIR COMPRESSOR—H. Richman, S. F.
229,500.—DESULPHURIZING ORES—H. F. Williams, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions* rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

Williams vs. Rome, Watertown and Ogdensburg R. R. Co.

U. S. Circuit Court, Northern District of New York.—Decided April 21, 1880; Blatchford, J.

In a suit in equity the plaintiff on recovery for infringement may obtain the profits to be accounted for by the defendant in addition to the damages which the plaintiff has sustained by the infringement, and these profits incident to a decree in equity cannot be turned into the plaintiff's pocket, which would have been the remuneration in a suit at law.

A decree entered for the plaintiff for \$3,545.96 as gains, profits and advantages, with cost.

Strauss et al. vs. King et al.

U. S. Circuit Court, Southern District of New York.—Decided April 29, 1880; Blatchford, J.

The application of rivets to pockets for uniting and closing the end of the seam at the corners, as claimed in reissued patent No. 6,335, dated March 16, 1875, involves invention, is not a mere double use or aggregation, and is patentable.

This case has been contested with great vigor. The bill was filed in Nov., 1876. Testimony was taken from May, 1877, to July, 1878. The plaintiffs examined 283 witnesses, and the defendants 145. The plaintiffs' proofs cover 2,465 printed pages, and the defendants' 1,196. The plaintiffs' brief covers 323 printed pages, and the defendants' 152. Infringement is not contested, but the defendants rely on want of patentability and want of novelty in the thing patented.

The usual decree for the plaintiffs.

Spill vs. The Celluloid Manufacturing Co.

U. S. Circuit Court, Southern District of New York.—Decided May 25, 1880; Blatchford, J.

1. The invention of the pretense as prescribed consisted in the use of camphor and alcohol in about equal proportions as a solvent of xylidine. The defendant mixed ground and dried xylidine with pulverized dry camphor, and then immersed the mixture in alcohol until the xylidine was dissolved: Held that it is immaterial, so far as the invention and the claim of the patent are concerned, whether the camphor and alcohol are mixed so as to dissolve the camphor in the alcohol and then the xylidine is put into the solution, or whether either the alcohol or the camphor is first mixed with the xylidine and then the third substance is added.

2. The invention, patent Nov. 30, 1869, No. 97,454, embraces the bringing together of camphor, alcohol and xylidine, causing xylidine to be dissolved or softened, so as to be more easy of conversion or working into compounds or articles containing xylidine.

3. In Spill's patent, No. 101,175, Mar. 22, 1870, the real invention covered is to be regarded as the bleaching of xylidine by ordinary bleaching agents directly after the converting acid had been washed out of it and before anything had been mixed with it which might interfere with the action of the bleaching agents.

U. S. Stamping Co. vs. King et al.

U. S. Circuit Court, Southern District of New York.—Decided June 1, 1880; Blatchford, J.

1. Letters patent, No. 119,705, granted E. A. Heath, Oct. 10, 1871, for an improvement in cuspadors, constructed and sustained.

2. Where the invention embraced by a prior patent is held not to anticipate a later patent upon which suit is brought, a reissue of such prior patent granted after the date of the later patent can have no effect upon the same.

3. A reissued patent has the same effect and operation in law as though it had been originally filed in the corrected form only on the trial of actions brought on it for causes thereafter arising, and has no such effect in any other cause or on any other purpose.

4. A preliminary injunction will not be refused, by reason of the fact that on a suit brought by the former owners of a patent it was declared invalid, where it also appears that it has been repeatedly sustained in other suits, and that there is important additional testimony which was not before the court rendering the adverse decision.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

ADVANTAGE OF THE RAILROAD.—The Reese

River Reveille, Austin, Nev., bears cheerful testimony to the advantages which are already felt in that section through the operation of the Nevada Central R. R., which connects Austin with the great transcontinental line. That paper says the business of the road is steadily increasing, and that the amount of freight passing over it is greatly in excess of what was anticipated; and it is believed that the railway will prove a valuable investment to the owners. Already a number of outside mining properties have become active on the promise of cheaper and quicker transportation, and others will follow the example during the summer. Business is increasing through Reese River valley, and south of Austin especially the mining districts have grown in importance since the completion of the Nevada Central.

At Anderson Springs the Fourth was very sociably but quietly observed. A picnic dinner was given by Mrs. Anderson and her daughters in the grove surrounding the hotel. Some 75 persons partook of the bountiful repast enchantingly spread amid delightful surroundings. A few campers and neighbors were among the invited guests. The hostess (nearly 70 years of age and one of the sprightliest of the party) was well toasted for the patriotic and kind-hearted spirit shown.

El Dorado County Notes.

EDITORS PRESS:—A few notes from the El Dorado county mines may be interesting to the readers of the PRESS. I have been in the county only a few days, and so have visited but few mines as yet, but I have already seen enough to convince me of what I, with many others, have long suspected to be a fact, viz: that one of the most suicidal and fatal mistakes made by the people of San Francisco and California is entertainment of the erroneous idea that the California gold fields are, to use a common phrase, "played out," and to obtain the precious metals in profusion it is necessary to go to the Comstock or to Arizona. A combination of causes has brought about this state of things, the most powerful and effective one being, probably, that the rich mining belt of California is not sufficiently remote from Pine Street and Pauper alley, in San Francisco, to prevent those who are swindled out of their spare change in and about these localities to pay flying visits to the mines, and see for themselves whether the statements made on paper and transferred from the hands of one street operator to another until it finds its way into the one general coffer of the bonanza kings, are truthful and reliable accounts of the amount of the auriferous substances actually extracted, or to be extracted.

The further from San Francisco you locate a new strike, the easier you induce capitalists and those looking for mining property to invest. There are mines right here in El Dorado county which their owners could not dispose of for \$10,000, but which, if they could be transferred to the remote wastes of treeless, waterless regions of central Nevada or some other distant locality, would be worth a round million, and could be sold for it, too. It is a fact that the "outside barbarian" has no idea of the wealth of gold which is stored away in these California hills, of easy access to the industrious miner. And this leads me to state that industrious miners are scarce in California. This country is full of old human fossils, relics of the earlier days, when the precious metal could be washed from the gravely ravines of California with a pan in almost fabulous abundance. This process is the only one known to many of these old timers, and they do not care, in their inertness and indifference, to learn of any way to extract the exhaustless store hidden away in the darksome caverns of the earth. This being the case, and the bonanza kings and rings diverting the attention of capital away from California, has resulted sadly for this rich auriferous region. But a slow but certain change is taking place. The depression of the Comstock and other stocks handled in San Francisco, and the activity and energy of a few enterprising capitalists who had the sagacity to discern the truth concerning the undeveloped wealth of California, is beginning to effect a reform in favor of this region, and I predict that in the near future capital will seek and find profitable investment in California mines.

I have visited the Gold Hill district, on the south side of the river. Here one of the most interesting mines is that owned by Kimball & Audlin, named the Mountain View mine. Over a year ago this mine was discovered, and although no mention of it has ever been made in the newspapers, you can form an idea of its richness when I state that Mr. Kimball, soon after its discovery, pounded out with a hand-mortar in one day \$3,000. Don't imagine, either, that the Mountain View mine is a "pocket" mine. The lead has been followed and opened up for only 150 ft., and the croppings all the way show rich rock. I was shown a 2½ ounce piece of rock which weighs \$38. A 11 pound piece was crushed with a hand-mortar, and \$800 was taken out. There are many such mines in El Dorado county. The Esperanza, in the Garden Valley district, owned by Messrs. Burlingham & Alderman, is another very rich mine. I went through this mine myself. The ledge near the surface is two ft., widening rapidly in the descent. At the depth of 30 ft. the ledge is 7 ft.; at the end of the 100-ft. tunnel it is 29 ft., and at 42 ft. below the tunnel widens to 31 ft., showing the interminable extent of the lead. A mill will soon be erected on this mine. This firm is also erecting a mill on the "Old Judge" mine, another rich mine, in the Kelsey district. But I will tell you mors of mines and mining in El Dorado county in my next. A. J. B.

LAND CASE DECISION.—A dispatch from Washington says that in the case of the pueblo lands of San Jose the Acting Commissioner of the General Land Office has decided that the small tract of land known as "Willow Grove," at the head of Guadalupa river, must be included in the official survey. This tract of land is owned by the Odd Fellows' Savings Bank of this city, and has been greatly improved by that corporation, which holds its title under the Pueblo Grant.

A PRODUCTIVE MINING DISTRICT.—The total production of bullion in the district of Silver Reef, Utah, says the Salt Lake Tribune, since the opening of the mines up to July 1st, is \$3,261,054. Considering the fact that this silver bullion was produced from sandstone which many of the world's experts had declared never contained metal, the production of Silver Reef is certainly remarkable.

ODD FELLOWS' LIBRARY ASSOCIATION.—We

have received from Mr. Geo. A. Carnes, librarian, the 25th annual report of this association for 1879-80. The report shows a very creditable condition of affairs. The receipts for the year were \$10,549.99, and the disbursements \$8,673.26, of which sum \$2,693.89 were paid for books, newspapers and magazines, and for binding and repairing books. The number of volumes on the register is 36,777. During the year donations of 425 volumes were made to the House of Correction and 189 to the State Prison at San Quentin. The number of volumes lent during the year was 96,567, classified as follows: belles lettres, 2,736; biography and letters, 3,054; history, 2,798; novels, 76,819; periodicals, 2,711; poetry and drama, 2,235; sciences and art, 2,074; theology, 365; voyages and travels, 3,145. It will be observed that the tastes of the ordinary reader, who has not yet learned to select "books which are books," tends towards the novel, but Mr. Carnes says it is his ambition to bring the circulation of the novel within the limits of the rule in the so-called "intelligent" communities of the Eastern States, beyond which his association is now some 8% or 10% in excess. The Librarian utters a mild but very reasonable complaint against the general practice of marring and defacing the books, to which grievous offense the softer sex is chiefly obnoxious. This more intelligent readers, too, are by no means blameless in this matter, for it appears that some of them are addicted to the vanity of interlining passages and scoring the margin with notes. Elia prattles with affectionate pride of his friend Coleridge's wont to "enrich with annotations, tripping their value," his darling folios; but it should not be forgotten that there are not many Coleridges' among even the critical readers of a library. Good books are always entitled to reverence.

A GREAT MINE IN MONTANA.—The Alice mine is to Montana, according to a correspondent of the Salt Lake Tribune, what the Ontario is to Utah. The mine was bought by the Walker Bros., of Salt Lake City, in 1876. In the following year they built a 20-stamp mill, which has been constantly running since, and has produced up to May 10th, ult., 487 bars of bullion, of 2,000 ounces each, amounting to about \$1,000,000. This fine property has recently been transferred to the Alice S. M. Co., including a 60-stamp mill in the course of construction. The new mill is to be finished early this fall. The great vein of the Alice mine varies from 10 to 70 ft. thick, and the pay ore from 4 to 40 ft. The mine has been opened and explored by 5 levels to the depth of 500 ft., and the main shaft has attained the depth of 700 ft. There still remain immense reserves of ore on all the levels. The upper is probably the most nearly exhausted, and there are yet on that level thousands of tons of free milling ore that it is estimated will yield \$75 per ton. It is probable that the company will soon build a 20-stamp wet crushing mill for the special purpose of working this free ore. All the ore extracted from the mine below the 100 level requires a chloridizing roasting, and this is done by two Howell furnaces. The larger part of the force employed in the mine at present is engaged in the work of exploration, as the ore supply was greatly beyond the capacity of the 20-stamp mill, and there were several thousand tons in the ore-house.

THE SACKETT SCHOOL.—From the first annual catalogue, which lies before us, we learn that the object of the Sackett School is "to do foundation work in education." This is a high and praiseworthy object—for the need of such work is large and growing—and entitles Principal Sackett to the consideration of parents and the guardians of children. A careful reading of the catalogue has impressed us with the belief that just such a school is needed for the training and preparation of youth for the college and the university; a school in which the tuition is rational, thorough and conscientious, and where the moral and physical discipline is judicious without being rigid. The faculty appears to be ample and of a high character, and the course of studies in the various departments is generous without being exacting. Study is diversified by those recreations that youth delights in, and the wholesome food and pleasant comforts of home. Reference is given to a number of gentlemen whose children have been pupils in the school. It is worthy of liberal patronage. The institution is in Oakland, on Hobart street near Telegraph avenue, a short walk from the Broadway station of the railroad.

A VALUABLE HANDBOOK.—We have received from A. L. Bancroft & Co. a copy of a valuable handbook for engineers and practical men. It is entitled "The Slide Valve Practically Explained." It embraces simple and complete practical demonstrations of the operation of each element in a slide-valve movement, and illustrates the effects of variations in their proportions, by examples carefully selected from the most recent and successful practice. The work is by Joshua Rose, M. E., author of "The Complete Practical Machinist," "The Pattern-Maker's Assistant," etc., and is illustrated by 35 engravings. It is issued by Henry Carsey Baird, Industrial Publisher, 810 Walnut St., Phil., and the publication price is \$1, sent by mail free of postage to any part of the United States.

News in Brief.

The Fisk University has graduated six negroes this year.

GERMANY sent England £3,000,000 worth of potatoes last year.

CLOVERDALE is building a small tannery and calls for a woollen mill.

THE Roumanians are setting out forests of young trees. In one place 14,000 have been placed.

A NATIVE of Surrey, N. H., has given \$10,000 to pay the town debt, and \$5,000 to establish a free library.

For the last fiscal year North Carolina spent \$326,040.85 for public schools and had a balance of \$147,170.94.

THE subscriptions to the projected railroad from Stockton to Bodis have been cancelled and the project abandoned.

SOUTH CAROLINA has six flourishing colleges, six female seminaries, three military academies and a colored university.

A cow in Cambria county, Pa., has undertaken the care of seven young pigs that were neglected by their mother.

COL. JAS. DIXON, a member of the Stevenson regiment, was drowned lately while fishing in Gold Lake, Sierra Co., Cal.

NEW YORK humans grocers request their patrons by placards to purchase supplies before 8 P. M., for the sakes of the clerks.

THE El Dorado Republican says that most of the cattle and sheep men have passed up into the mountains with their stock.

A MECHANICVILLE (N. Y.) farmer protects his hen roost from hawks and thieves by keeping a flock of a dozen guinea fowls.

THE new breed of whales reported to have made their appearance in the Arctic seas are larger and tamer than the old whales.

THE Oakwood herd of Short-Horns was sold at Dexter Park, Chicago, July 1st. There were 39 head, which sold for a total of \$60,250.

AT New York, July 1st, the exports of wheat, corn and oats amounted to 1,250,000 bushels—the largest amount ever reached there in one day.

THE Wesleyan Chapel, in City Road London, founded by John Wesley, which was partially destroyed by fire in December last has been restored.

OVER 500 sick women and their little children enjoyed the delicious surf bathing and the hospitality of the Seaside Sanitarium at Rockaway beach, June 26th.

THE Agricultural Association, comprising the counties of El Dorado, Amador, Placer, Nevada, Mono and Alpine, will hold its tenth annual fair at Placerville.

THERE lately arrived in New York city, from Albany, a horse 20 hands and 1 inch high, and weighing 2,450 lbs. He is a dark bay, and without spot or blemish.

THE Santa Cruz papers state that the population of Monterey aggregates 1,400 persons, and that a large majority of those are natives of Mexico and California.

AT Hamden-Sidney College, in Virginia, the Arts degree is to be given hereafter to students who substitute both French and German for either Greek or Latin.

FREQUENT and heavy showers throughout the northwest have already greatly delayed the harvest of wheat, and impeded the cultivation of corn and hay-making.

THE Philadelphia Grand Jury meets with encouragement in its proposition to revive the pillory and whipping post as a means of punishment for petty crimes.

LATELY in New York a 16-months-old child had her ears pierced for earrings, and was immediately attacked by facial erysipelas, from the effects of which she died.

THE first Merino sheep ever shipped from Vermont to Montana were shipped last week from Middlebury, and filled two cars, one load being all registered stock.

SUBSCRIPTIONS are to be raised throughout England for the widows and orphans of the officers and crew of the *Atalanta*. All hopes of the safety of the vessel are abandoned.

TWO-THIRDS of the American tourists now in Europe expect to go to the Ober-Ammergau Passion play. Myriads of English will go there, too, on the Cook excursion tickets.

AT Memphis within three months and a half, 20 miles of sewerage pipes and 30 miles of subsoil drain pipes have been put down, and beneficial results are already discernible.

THE latest reports from the famine districts in Ireland show that many parishes have not yet received any relief at all and that in the month of July there will be a fearful suffering.

THE coinage at the U. S. Mint for the fiscal year ending June 30th was valued at \$84,370,144, of which \$27,934,750 were standard silver dollars. This exceeds the coinage of any previous year.

THE Spanish government will not permit the exiled religious societies of France to establish themselves in Spain near the French border, and elsewhere only after vigorous examination into their character.

THE United States Entomological Commissioners are making preparations to resume the investigation of the Rocky Mountain locust and grasshopper and the cotton worm under the new appropriation of \$25,000.

THE announcement that the Empress of Russia died alone, unattended by any member of her family, and during even the absence of the one servant who was in her room during the night, has given rise to much comment in England.

The Mechanics' Fair Daily.

By authority of the BOARD OF MANAGERS OF THE MECHANICS' INSTITUTE FAIR the publishers of the MINING AND SCIENTIFIC PRESS will issue a large edition of the ELEVENTH VOLUME of the MECHANICS' FAIR DAILY during the FIFTEENTH INDUSTRIAL EXHIBITION, which opens in San Francisco, Tuesday, August 10th, 1880.

It will be of large size, printed and circulated FREE in the Pavilion, and contain the day and evening programme, a list of exhibits, and official bulletin of the Institute.

Its columns will embrace a large variety of important industrial and scientific information, illustrations and well written descriptions of the general features and most deserving and novel exhibits in the Fair, a record of the Fair and incidents of its daily progress—gay, serious and comic—as they occur.

The host of editorial, reportorial and corresponding talent will be employed, with a view to make the paper of live interest in all its departments and of standard value as a full record of the great exhibition, the wonderful inventions, rich resources and rapid progress of our great Western Community.

More than ONE HUNDRED THOUSAND different individuals will read copies of our paper during the Fair. The novel character of the journal—the specially attractive features of its free issue in the Pavilion, and its absorbing interest to visitors at the Fair, the attention its columns command when brought into the shop and family circle by those who receive it freely at the Fair, make the paper a powerful advertising medium.

The Managers have granted us the exclusive advertising and printing privileges, and will receive no advertising in the official catalogue and reports.

Our ten previous volumes have met with unrivaled success and gratifying results to advertisers, nearly all of whom were leading and first-class business firms.

Many thousands of marked copies were sent by mail and otherwise to friends near and distant, giving the FAIR DAILY a mere broadcast and universal circulation than any other newspaper published.

Its columns are more closely examined throughout than those of any ordinary publication.

By past experience, ample facilities, and a fair reputation of doing business in our line, we expect, with the reasonable support of all naturally interested in the success of our enterprise, to make the coming volume superior to its predecessors, and eminently satisfactory to the Institute, to our patrons and to the general public, who are more or less benefited by such an advocate of the substantial advancement of the grand and worthy industries of our coast.

DEWEY & CO., Publishers.
Office, MINING AND SCIENTIFIC PRESS, No. 202 Sansome street, N. E. corner Pine, San Francisco.

AN ENTOMOLOGICAL REPORT.—We are informed from Washington that Prof. Comstock's report on entomology has been completed, and will be prepared for publication immediately. The report describes the habits of about 50 species of insects, among which are the army worm and a new species of hopper, which devastated the wheat fields in the South during last spring; it also treats of the habits of several species of insects which are injurious to clover, to forest, shade and fruit trees, and to gardens and vegetables. A preliminary report is made of an investigation of insects which are injurious to orange trees. This highly important investigation was begun in Florida last winter, and will be continued in California this winter. It is an excellent feature of the report of Prof. Comstock that it is written in popular style, and is designed for circulation among farmers. However, the scientific features of each topic discussed are given for the benefit of entomologists.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bollito. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

Quinine and Arsenic

Form the basis of many of the Ague Remedies in the market, and are the last resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. AYER'S AGUE CURE is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent and certain, and no injury can result from its use. Besides being a positive cure for Fever and Ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive, as well as cure, of all complaints peculiar to malarious, marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

FOR SALE BY ALL DEALERS.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

THE BEST NEWSPAPER FILEHOLDER AND ADJUSTABLE BINDER can now be had at this office. It consists of elastic fastenings, with stiff, cloth covered side. Size suitable for a full volume of this paper, \$1. To our subscribers 75 cts., mailed postpaid.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus and terms of subscription, and request that they circulate the copy sent.

SETTLERS and others wishing good farming lands for stock crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento valley. His advertisement appears from time to time in this paper.

FRESH attractions are constantly added to **WOODWARD'S GARDENS**, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

EXTRA COPIES can usually be had of each issue of this paper, if ordered early. Price, 10 cents, postpaid.

Chew JACKSON'S BEST Sweet Navy Tobacco.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,
San Francisco, July 2, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend (No. 17) of Seventy-Five cents (75c.) per share was declared, payable on MONDAY, July 12, 1880, at the office in this city, or at the agency of The Nevada Bank of San Francisco in New York.

WM. WILLIS, Secretary.

Office—Room 29, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Consolidated Virginia Mining Company,
Room 26, Nevada Block, No. 309 Montgomery St., S. F.

At a meeting of the Board of Trustees of the Consolidated Virginia Mining Company, held this seventh day of July, 1880, dividend (No. 52) of Fifty (50) Cents per share was declared payable on THURSDAY, the fifteenth day of July, 1880.

Transfer books closed until the 16th instant.

A. W. HAVENS,

Secretary.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 42), levied on the Fifth day of May, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Bracket, Franklin B.	139	100	20 00
Bracket, Franklin B.	190	100	20 00
Bracket, Franklin B.	191	100	20 00

Name.	No. of Certificate.	No. Shares.	Amt.
Bracket, Franklin B.	102	75	15 00
Bruffield, Enoch	103	150	30 00
Barbour, Harry N.	173	100	20 00
Beebe, A. O., Trustee	207	100	20 00
Beebe, A. O., Trustee	208	100	20 00
Beebe, A. O., Trustee	209	100	20 00
Beebe, A. O., Trustee	300	100	20 00
Beebe, A. O., Trustee	301	100	20 00
Beebe, A. O., Trustee	302	100	20 00
Beebe, A. O., Trustee	303	100	20 00
Beebe, A. O., Trustee	304	100	20 00
Beebe, A. O., Trustee	305	100	20 00
Beebe, A. O., Trustee	306	100	20 00
Beebe, A. O., Trustee	307	100	20 00
Beebe, A. O., Trustee	308	100	20 00
Beebe, A. O., Trustee	309	100	20 00
Beebe, A. O., Trustee	310	100	20 00
Beebe, A. O., Trustee	311	100	20 00
Beebe, A. O., Trustee	312	100	20 00
Beebe, A. O., Trustee	313	100	20 00
Beebe, A. O., Trustee	314	100	20 00
Beebe, A. O., Trustee	315	100	20 00
Beebe, A. O., Trustee	316	100	20 00
Beebe, A. O., Trustee	317	100	20 00
Beebe, A. O., Trustee	318	100	20 00
Beebe, A. O., Trustee	319	100	20 00
Beebe, A. O., Trustee	320	100	20 00
Beebe, A. O., Trustee	321	100	20 00
Beebe, A. O., Trustee	322	100	20 00
Beebe, A. O., Trustee	323	100	20 00
Beebe, A. O., Trustee	324	100	20 00
Beebe, A. O., Trustee	325	100	20 00
Beebe, A. O., Trustee	326	100	20 00
Beebe, A. O., Trustee	327	100	20 00
Beebe, A. O., Trustee	328	100	20 00
Beebe, A. O., Trustee	329	110	20 00
Beebe, A. O., Trustee	330	100	20 00
Beebe, A. O., Trustee	331	100	20 00
Call, Jonas	32	2000	400 00
Call, Jonas	33	1000	200 00
Chapman, C. C., Trustee	210	500	100 00
Chapman, C. C., Trustee	211	500	100 00
Chapman, C. C., Trustee	212	500	100 00
Chapman, C. C., Trustee	213	500	100 00
Chapman, C. C., Trustee	214	375	75 00
Day, Wm H.	334	50	10 00
Day, Wilbur F.	259	100	20 00
Day, Wilbur F.	260	110	22 00
Day, Wilbur F.	261	50	10 00
Day, Wilbur F.	262	50	10 00
Ellis, H. C.	290	250	50 00
Grant, Peter	336	775	155 00
Goodrich, S. S.	142	50	10 00
Goodrich, S. S.	143	50	10 00
Goodrich, S. S.	144	50	10 00
Goodrich, S. S.	145	50	10 00
Goodrich, S. S.	146	50	10 00
Goodrich, Geo B.	179	50	10 00
Goodrich, Geo B.	180	50	10 00
Goodrich, Geo B.	181	50	10 00
Goodrich, Geo B.	182	50	10 00
Goodrich, Geo B.	183	50	10 00
Hawes, Forest G.	165	100	20 00
Hawes, Forest G.	166	100	20 00
Hawes, Forest G.	167	50	10 00
Jenke, Levi	101	500	100 00
Jewett, Thomas A.	102	50	10 00
Jewett, Thomas A.	103	50	10 00
Jewett, Thomas A.	104	50	10 00
Jewett, Harriet A.	105	50	10 00
Jewett, Harriet A.	106	50	10 00
Jewett, Harriet A.	107	25	5 00
Jordan, Geo E.	160	100	20 00
Jordan, Geo E.	161	100	20 00
Jordan, Geo E.	162	100	20 00
Jordan, Geo E.	163	100	20 00
Jordan, Geo E.	164	100	20 00
Jordan, Geo E.	175	100	20 00
Jordan, Geo E.	176	150	30 00
Jewett Arthur	332	475	95 00
Lewis, Weston, Trustee	93	250	50 00
Lewis, Weston, Trustee	94	100	20 00
Lewis, Weston, Trustee	95	50	10 00
Lewis, Weston, Trustee	96	50	10 00
Lewis, Weston, Trustee	97	50	10 00
Maxey, Louisa	119	100	20 00
Maxey, S. N.	194	500	100 00
Maxey, S. N.	195	500	100 00
Maxey, S. N.	196	100	20 00
Maxey, S. N.	197	100	20 00
Maxey, S. N.	198	200	40 00
Maxey, S. N.	199	250	50 00
Maxey, R. S.	170	500	100 00
Maxey, R. S.	171	500	100 00
Maxey, R. S.	172	500	100 00
Maxey, R. S.	173	300	60 00
Maxey, R. S.	174	200	40 00
McAfee, Wm.	200	500	100 00
McAfee, Wm.	201	500	100 00
McAfee, Wm.	202	190	38 00
Norton, Chapman & Co.	344	100	20 00
Norton, Chapman & Co.	345	100	20 00
Norton, Chapman & Co.	346	90	18 00
Norton, Chapman & Co.	347	100	20 00
Norton, Chapman & Co.	348	100	20 00
Norton, Chapman & Co.	349	100	20 00
Norton, Chapman & Co.	350	100	20 00
Norton, Chapman & Co.	351	100	20 00
Norton, Chapman & Co.	352	100	20 00
Norton, Chapman & Co.	353	100	20 00
Norton, Chapman & Co.	354	20	4 00
Plaisted, Nancy M.	147	125	25 00
Freble, Edward E.	225	40	8 00
Stevens, Mrs H A.	76	100	20 00
Stevens, Mrs H A.	77	100	20 00
Stevens, Mrs H A.	78	100	20 00
Stevens, Mrs H A.	79	50	10 00
Stone, W W.	159	200	40 00
Skinner, Maria	384	250	50 00
Wood, Ray T.	148	100	20 00
Wood, Ray T.	149	100	20 00
Wood, Ray T.	150	100	20 00
Wood, Ray T.	151	100	20 00
Wood, Ray T.	152	100	20 00

Also, 408 shares of the old issue, equal to 2040 shares of the new issue of the capital stock of the said Gover Mining and Milling Company.

Name	No. of Certificate.	No. of Old Shares.	No. of New Shares.	Amt
Cook, L D.	210	10	50	10 00
Cook, L D.	871	5	25	5 00
Goding, E L.	254	25	125	25 00
Goding, E L.	741	15	65	13 00
Grant, Peter	834	18	90	18 00
Grant, Peter	915	25	125	25 00
Grant, Peter	917	5	25	5 00
Goding, E.	143	50	250	50 00
Goding, Ephraim	739	20	100	20 00
Goding, Mrs E.	740	12	60	12 00
Gorrie, Thomas	682	10	50	10 00
Hayes, R T.	21	10	50	10 00
Mitchell, J L.	150	10	50	10 00
Mitchell, J L.	172	10	50	10 00
Mitchell, J L.	372	5	25	5 00
Mitchell, J L.	465	5	25	5 00
Mitchell, J L.	766	10	50	10 00
Rogers, Geo L.	152	20	100	20 00
Wallace, Jas H.	365	25	125	25 00
Wallace, Jas H.	366	25	125	24 00

And in accordance with law and an order of the Board of Directors made on the fifth day of May, 1880, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, room 8, No. 402 Front street, San Francisco, California, on Wednesday, the fourteenth day of July, 1880, at the hour of one o'clock P. M. of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

W. O. WILSON, Secretary.

Office—No. 402 Front street, room 8, San Francisco, California.

W. T. GARRATT'S

BRASS and BELL FOUNDRY

SAN FRANCISCO.

MANUFACTURER AND IMPORTER OF

Church and Steamboat BELLS and GONGS
BRASS CASTINGS of all kinds
WATER GATES, GAS GATES,
FIRE HYDRANTS,
DOCK HYDRANTS,
GARDEN HYDRANTS

General Assortment of Engineers' Findings

Hooker's Patent
Celebrated

STEAM PUMP

27 The Best and Most
Durable in use. Also,
a variety of other

PUMPS

For Mining and Farming
Purposes.

ROOT'S BLAST BLOWERS,

For Ventilating Mines and for Smelting Works.

HYDRAULIC PIPES AND NOZZLES,

For Mining Purposes.

Garratt's Improved Journal Metal.

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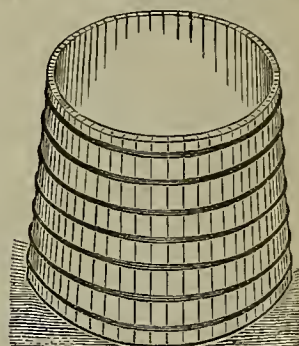
IRON PIPE AND MALLEABLE IRON FITTINGS.

ALL KINDS OF

WORK AND COMPOSITION NAILS,

AT LOWEST RATES.

MECHANICS' MILLS.



OUR WELL KNOWN

WATER TANKS,

Made by machinery, constantly on hand and made to order. PAN STAVES, WOOD PULLES and OAK GUIDES a specialty.

WELLS, RUSSELL & CO.,

Mechanics' Mills, corner Mission and Fremont street.

HOSKIN'S DEFLECTOR.

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Manufacturers of Giant's, Perkins & Hoskins Deflectors
Mill and Mining Machinery.

Some fine sunny offices (next to the PRESS office), to rent (at very reasonable rates), by Dewey & Co., at 202 Sansome street, corner of Pine.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending this date, the Board of Directors of THE GERMAN SAVINGS AND LOAN SOCIETY has declared a dividend on Term Deposits at the rate of six (6) per cent. per annum; and on Ordinary Deposits at the rate of five (5) per cent. per annum, free from Federal Taxes, and payable on and after the 15th day of July, 1880. By order.

GEO. LETTE, Secretary.

San Francisco, June 30, 1880.

DIVIDEND NOTICE.

San Francisco Savings Union, 633 California street, corner Webb. For the half year ending with June 30, 1880, a dividend has been declared at the rate of six (6) per cent. per annum on Term Deposits, and (5) per cent. per annum on Ordinary Deposits, free of Federal Tax, payable on and after Wednesday, July 1, 1880.

LOVELL WHITE, Cashier.

W. W. HANSCOM,

Mechanical and Consulting Engineer.

Office: No. 17 Halleck St., Opp. Wells, Fargo & Co., S. F.

LAREPORT, Lake Co., Cal., Nov. 2d, 1878.

MESSES. DEWEY & CO.—Gentlemen:—I hereby acknowledge receipt of patent, for which please accept my sincere

Iron and Machine Works.

HOS. PENDERGAST.

HENRY S. SMITH.

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MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

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PRACTICAL BOILER MAKER.

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK,

Repairing promptly attended to at the lowest possible terms.

UNION IRON WORKS,

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MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

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PHELPS

MANUFACTURING COMPANY.

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS.

HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 and 17 Drumm St., near California,

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Golden State & Miners Iron Works,

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

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California Brass Foundry,

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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. H. WEED. V. KINGWELL.

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General Mechanical Engineer and Machinist. Steam Engines, Flour, Quartz and Mining Machinery. Sole manufacturer of Brodie's Patent Rock Crushers and Steel-Faced Tappets. Agent and Manufacturer of F. A. Youse's Patent Steam Packing Rings for Steam Pistons. The heat ever invented; can be applied to any Engine Piston and give entire satisfaction to those using. Steam, Hydraulic and Sidewalk Elevators. Repairing promptly attended to.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

THOMAS THOMPSON.

THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

WIND MILL.

One of the best made in this State for sale cheap on easy terms. Address, W. T., care of Dewey & Co., S. F.

GEORGE W. PRESCOTT.

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Office, 61 First St. | Cor. First & Mission Sts., S. F. | P. O. Box, 2128.

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STEAM, AIR AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry.—All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,BABY HOISTS,
VENTILATING FANS,
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PULLEYS,STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

Send for Late Circulars.

PRESCOTT, SCOTT & CO.

William Hawkins,

(SUCCESSOR TO HAWKINS & CANTRELL).

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210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturer of

IMPROVED PORTABLE HOISTING ENGINES,

FOR MINING AND OTHER PURPOSES.

Also of the HAWKINS' PATENT ELEVATOR HOIST, for Hotels, Warehouses and Public Buildings.

Steam Engines and all Kinds of Mill and Mining Machinery.

Fulton Iron Works.

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Marine Engines and Boilers,

Propeller Engines either High Pressure or Compound Stern or Side Wheel Engines.

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Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

Mill Machinery.

Batteries for Dry or Wet Crushing, Amalgamating

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of all kinds, either for use on Steamboats and made in accordance with the Act of Congress regulating the same, or for use on land. Water Pipe, Pump Air Column, Fish Tanks for Salmon Canneries of every description.

Boiler repairs promptly attended to and at very moderate rates.

Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores Water Jackets, Etc.

Sugar Machinery.

Crushing Rolls, Clarifiers, Vacuum Pans, Air Pumps, Concentrators, Bag Filters, Charcoal Filters, Blow-up Tanks, Coolers and Receiving Tanks.

Miscellaneous Machinery.

Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Oil Well Retorts, Powder Mill Machinery, Water Wheels.

PACIFIC IRON WORKS,

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RANKIN, BRAYTON & CO.,

Manufacturers of

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING, AND MINING MACHINERY INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

Agents for the Allen Engine Governor, Bailey Air Compressor, Howell's Improved White Furnaces, Walker's Compound Steam Pumps, Etc.

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MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

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Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON.

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Stationary and Compound Engines, Quartz Crushing and Amalgamating Machines, Flour, Sugar and Saw Mill Irons.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

Repairing of Every Description Promptly Attended to



Corner Beale and Howard Sts.,

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Builders of Steam Machinery

IN ALL ITS BRANCHES,

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HIGH PRESSURE OR COMPOUND.

STEAM VESSELS, of all kinds, built complete with Hulls of Wood, Iron or Composite.

ORDINARY ENGINES compounded when advisable.

STEAM LAUNCHES, Barges and Steam Tugs constructed with reference to the Trade in which they are to be employed. Speed, tonnage and draft of water guaranteed.

STEAM BOILERS. Particular attention given to the quality of the material and workmanship, and none but first-class work produced.

SUGAR MILLS AND SUGAR-MAKING MACHINERY made after the most approved plans. Also, all Boiler Iron Work connected therewith.

WATER PIPE, of Boiler or Sheet Iron, of any size made in suitable lengths for connecting together, sheets rolled, punched, and packed for shipment ready to be riveted on the ground.

HYDRAULIC RIVETING. Boiler Work and Water Pipe made by this establishment, riveted by Hydraulic Riveting Machinery, that quality of work being far superior to hand work.

SHIP WORK. Ship and Steam Capstans, Steam Winches, Air and Circulating Pumps, made after the most approved plans.

PUMPS. Direct Acting Pumps, for Irrigation or City Water Works purposes, built with the celebrated Davy Valve Motion, superior to any other Pump.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER.



Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

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All ordinary mending, sewing on buttons, etc., free of charge. Orders left at the office will receive prompt attention. Work called for and delivered to any part of the city free of charge.

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Steam Packing,

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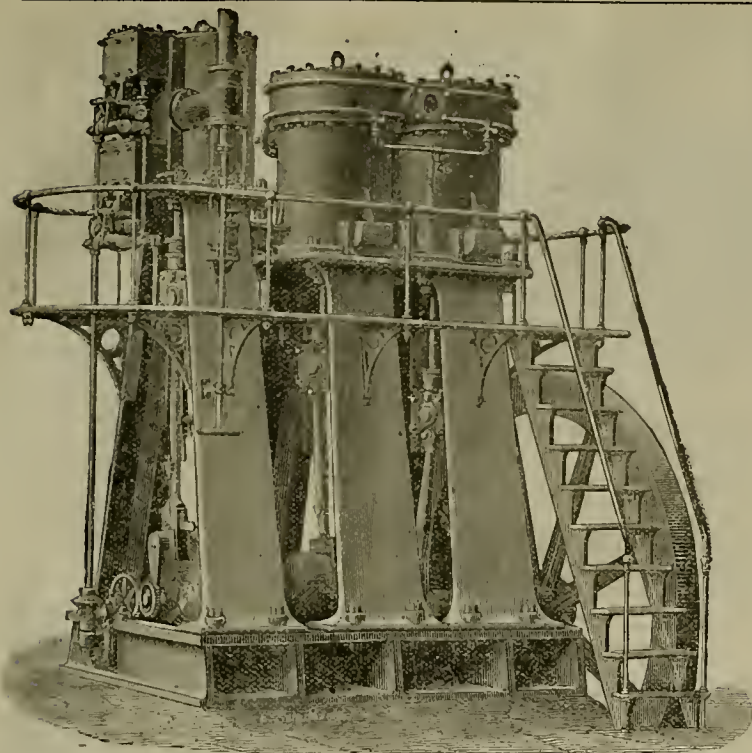
The Gutta Percha & Rubber Man'g Co.,

J. W. TAYLOR, Manager,

Cor. Market and First Street, SAN FRANCISCO.

New Book on the Comstock.

The attention of MINING ENGINEERS and EXPERTS is called to the new work by JOHN A. CHURCH, E.M. Ph. D., on "The Comstock Lode, Its Formation and History." This very exhaustive treatise on this famous lode is fully illustrated with diagrams and colored charts showing sections, ore bodies, etc., and will be of great interest and permanent value for reference. Dewey & Co., Publishers of the MINING AND SCIENTIFIC PRESS, are sole agents for the sale of the work. Mr. E. M. SLEATOR will act as their agent, and call on Mining Engineers and those interested in the great lode in this city with a copy of the book for their inspection.



Mining Machinery Depot,

PARKE & LACY,

21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED

AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

Small Sizes made in Sections not to Exceed 300 lbs.

FRUE'S ORE CONCENTRATOR OR VANNER.
Plunger Jigs. Revolving Screens.
CRUSHING ROLLERS. SAMPLE GRINDERS.

FRASER & CHALMERS
Mining Engines, Boilers, Stamp Mills, and Machinery for Systematic Mining, Milling, Smelting, and Concentration of Ores.
No. 145 Fulton St. CHICAGO, ILL.

Howell's Improved White Roasting Cylinders.
REVOLVING CYLINDERS AND ORE DRYERS.
Hoisting and Pumping Machinery.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 XX is the Strongest Explosive Known.
No. 2 is superior to any powder of that grade.

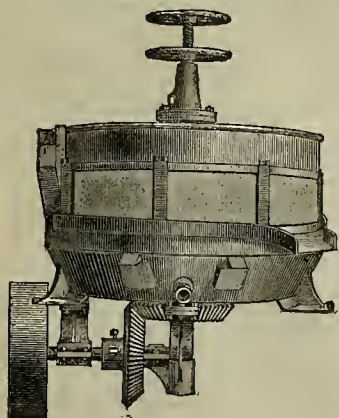
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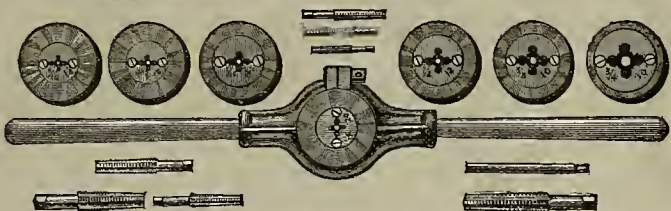
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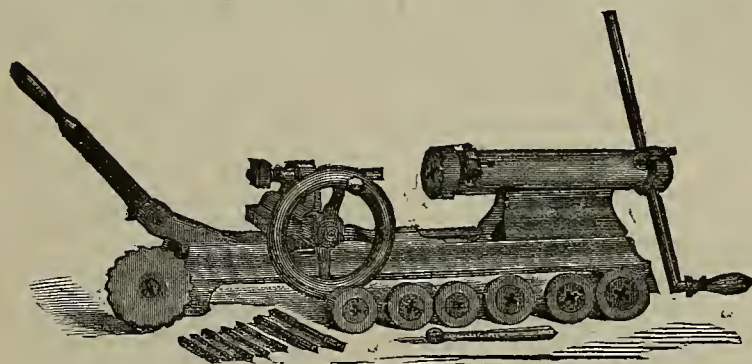
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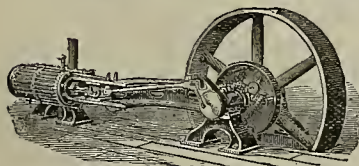
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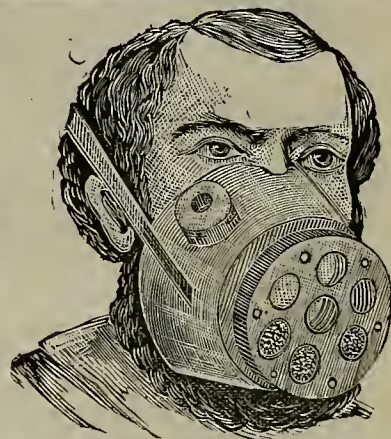
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VOLUME XLII
Number 3.

The Hoover Telephone.

We give herewith a pictorial representation of what may be called a mechanical telephone. It is not operated by either electricity or magnetism; but consists of a simple arrangement of metallic diaphragms, placed in intensifying drums and connected by a copper wire. The instrument is known as the "Hoover Telephone." It is being largely introduced and gives very good satisfaction over short distances. Hitherto it has not been used over a space exceeding one mile, but the proprietors have no hesitation in putting it up and guaranteeing satisfaction over much longer lines. This telephone transmits the voice as faithfully and as distinctly as the Edison or Bell telephone, and costs much less, being furnished, with appliances for a call, at the very low price of \$10 each, with an addition of five cents per rod for whatever wire is needed to make the connections between the two points. Ten cents each is also added for such tension springs and hearings as will be required in putting up and sustaining the wires. Insulators, five cents each. A simple telephone, without a call, is furnished for \$5, the cost of wire, insulators, etc., to be added as in the first instance. Figure 1 represents a sectional view of a telephone complete, or rather of one terminus of the same. The mouthpiece, it will be observed, is funnel-shaped, concentrating the sound of the voice at the center of the diaphragm, from whence the vibrations are transmitted by the wire, as shown, to a similar instrument at the other extremity. In the lower portion of the instrument, as shown, there is a mechanical call, which, by the use of a spring, key and pawls, is made to cause a small hammer to beat rapidly upon the inner side of the diaphragm, the sounds from which are conveyed by the wire to the telephone at the other extremity, where they are repeated so loudly and so distinctly as to arrest attention about as readily as the ordinary magneto bell. Figs. 2 and 3 represent a perspective and sectional view of the telephone without the "call." The only method of calling with these instruments is by a rapid tapping of the pencil on the diaphragm. Such a call answers very well for short distances, and where the call is not expected to arrest the attention at any great distance from the instrument.

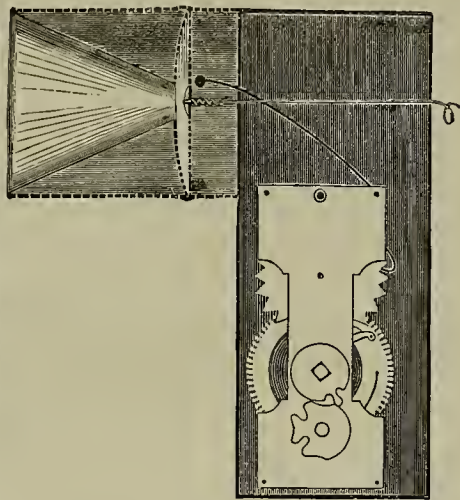
For connecting an office or store with a factory, a physician's office with a drug store, two private residences, an upper with a lower floor, and for many other uses this instrument answers every practical purpose. It is cheap and can be sent by express, C. O. D., to any part of the country, with all necessary directions for putting it up and operating. We have one of these instruments to connect our editorial rooms in the front with the composition rooms in the rear of a long building, running from street to street. Quite a number are also in use in various parts of the city and in Oakland. Sold in this city by the Hoover Telephone Co., room 24, at 328 Montgomery St. Send for circulars, which will give all particulars.

MINING ENTERPRISE IN UTAH.—At Stockton, in Tooele Co., Utah Territory, the Longmaid smelting works, which have been idle for several years, are being greatly enlarged by Gen. P. E. Connor, as we learn from a correspondent of the Salt Lake Tribune. The old machinery has been removed, and very little of the old buildings will remain after the contemplated changes are made. The new works will be supplied with a powerful engine of 60-horse power and a hoiler of corresponding capacity. Extensive concentration apparatus will form one of the features of the works. They are designed for working the ores of the Great Basin mine, of which property Gen. Connor is an owner. The mine is now yielding large quantities of ore, and the writer pronounces the enterprise one of the most promising and valuable in the Territory.

News has been received from the west coast of Africa that trade has been greatly interfered with by the withdrawal from circulation on the gold coast of all American dollars.

WANTED—MORE THOROUGHNESS.—Thoroughness is the one thing needed in our systems of education. We have far too many clever smart-torers—too many jacks-of-all-trades. One of our critics, himself well equipped for the battle of life, has declared that the difficulty in our America is, that while we are all "pretty well" educated, "very few of us are first-rate and carry as many guns as we might. We forget that if a man does not know a thing accurately he positively does not know it at all." The same authority remarked that during the past 25 years "there has not graduated from any American college a man who has yet made any great mark either as a lawyer, an orator, a statesman, a poet, a preacher, an essayist, or an historian." Inaccuracy is our besetting sin. Such phrases as "pretty near," "about right," "near enough," are rarely heard in any other country, and may be set down as peculiar to Americans. Thoroughness is a marked quality of German training, and German specialists command the admiration and the money of this world. American young men must become more accurate, thorough and downright, or our

FIG. 1.



THE HOOVER TELEPHONE.

places of honor and emolument will be filled by the stranger.

THE SEAT OF COMMOION.—A dispatch from London the 9th inst., announces an earthquake at St. George, one of the Azores, and the formation of another island about 600 yards distant, and some 1,800 square yards in extent. Those western islands have been the scene of violent upheaval and disturbance since they were colonized in the middle of the 15th century. In 1591 there was a violent concussion of the earth during 12 days; and a devastating earthquake occurred in 1757. In 1808 a volcano on the island of St. George destroyed the town of Ursulina; and three years later a volcano appeared in the sea near the island of St. Michael. And an island called Satrina gradually disappeared in 1812. No where else on the globe, perhaps, are the ups and downs of life so marked as on the Azore group.

A CHEERFUL VIEW OF LAKE DISTRICT.—Affairs in Lake District, Mono Co., have assumed a more cheerful appearance since the starting of the Mammoth mill. The Herald says that now, with a plenty of good ore in sight in the mine, and the mill in better condition than ever before, it is reasonable to predict that a long and successful run will be made. The shipment of bullion by the Mammoth company will infuse new life into other incorporations which have stood still while that company bore the brunt of carrying on active operations. The opening of the mill has led to the employment of additional men, and the state of the district is quite encouraging.

The Outlook on the Comstock.

This long-continued depression of the mines of the Comstock has impelled many both at home and abroad to express doubts of their recovery. Some have gone so far as to predict a collapse of the great property. We are told that while dividends have almost ceased to be paid by any Comstock mine, assessments are levied regularly along the entire line; and that these assessments have grown to be a burden too grievous to bear. Assessments are always felt to be burdensome; but this evil is not an unmixed one. There is not much doubt about the statement that a considerable percentage of the shares of the more conspicuous mines of the Comstock are held abroad, nor that there is a very large one in the hands of the men who manage and control them. The bulk of the assessment money is immediately redistributed to miners and laborers and machine shops, as well as to that large class which furnishes material and supplies, and through these various avenues it

FIG. 2.

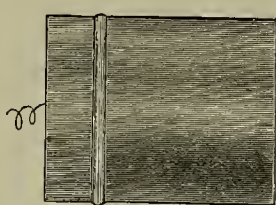
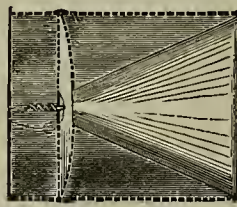


FIG. 3.



most suggestive. People can draw whatever conclusions they like from the foregoing, but the opinion formed by us when examining the formations in these three crosscuts was that they constituted the top of an ore body, and we have had no reason since to change our opinion.

The facts in the case are likely to be soon known, as the north lateral drift is very near a point under the middle of the crosscuts above made. The intention is to run crosscuts simultaneously in to the ore vein from points 900 and 1,000 ft. north of the incline, and these will be started very soon.

The company is preparing and has been since the crosscuts on the 2300 were run, to open more direct communication through its main shaft with this portion of the mine. The station for the incline rises from the 2300 to the bottom of the main shaft is now excavating, and a contract has been entered into to raise the incline. The distance perpendicularly is 500 ft., although nominally 600, an extra 100 ft. having been added to the lower levels of the mine for uniformity in depth and along the north end.

Of Union it is necessary to say but little, as much has already been said from time to time about this situation there. It is known that the greatest reach and wealth of the ore body in Union was on the sill floor of the 2400 level, which is the farthest down that any positive knowledge of it extends. This fact, however, that the ore formation extends to the drift run to connect winzes No. 1 with the Sierra Nevada incline, that it feathers out even to the line of connection between winze No. 1 and 2, both of which workings were calculated to be beyond it, ought to satisfy everybody that the 2500 of Union will open up well. Few, if any, in this section who are at all familiar with the situation have any doubt about the result of pushing excavations into that portion of the vein where ore is expected, since it has been found where not expected.

THE POWER OF CONSCIENCE.—Recently the Treasury Department received from an unknown and repentant sinner the sum of \$100, with no other explanation than that it belonged to the Government. The money was placed to the credit of the Conscience Fund. It is stated that since the close of the civil war the contributions to this fund, always from unknown persons, have reached about \$200,000. One day as high as \$11,000 were received, and several times the receipts to the fund have been \$5,000 on a single day. Sometimes the person sending the money confesses that he has smuggled goods or has defrauded the Internal Revenue, and that the sum that he returns rightfully belongs to the Government. These acts of restitution, though quite too few and far between, are refreshing evidence of the power of conscience.

GROWTH OF AMERICAN AGRICULTURE.—The enormous growth of our agriculture is shown by a writer in the *International Review*, whose figures, pending the publication of the census returns, may be accepted as trustworthy. Our authority says that in 1865 the wheat crop was 148,543,000 bushels; in 1879, 418,756,000. Corn in 1865 was 704,427,000 bushels, and in 1879, 1,544,000,000 bushels. Within 30 years the corn center has been transferred from the South to the West, and the wheat center from the Middle States to the West. The tobacco increase has, of course, been in the Southern States. Within the same period the cotton crop has increased from 3,012,000 bales to 5,216,000. Arkansas and Texas are the largest gainers from the increase in cotton. The total exports of all grains have risen from 39,000,000 bushels in 1878 to 189,000,000 bushels in 1879.

A PROMISING QUARTZ CLAIM.—There is considerable promise about the Bulow quartz claim, near Jones' Bar, on the South Yuba river. We learn from the Nevada Herald that two tunnels have been driven on the claim, and each one on a different ledge. In tunnel No. 1, which is 70 ft. long, there is a ledge 5½ ft. wide, which contains a heavy percentage of sulphurets, and carries besides free gold. In tunnel No. 2 the ledge is irregular along the 20-ft. run, but the croppings warrant the belief that it will yet prove as good as that found in No. 1.

returns again to general circulation. That part of the money, be it great or little, which comes from the outside holder of mining shares is an unmixed good to the community.

In the meantime the necessity for assessments on some of the mines, especially on several at the north end, was never before so apparent. The difficulty of carrying on explorations at a great depth and in the presence of a vast volume of water is costly business. It appears to be at the north end of the Comstock that favorable developments are now looked for, and how far this expectation is justified the annexed intelligent and clear review of the situation by the Gold Hill News will show. To enable the reader to understand the posture of affairs in Sierra Nevada, the writer gives just a brief sketch of operations on the 2300 of that mine. In the crosscut run east 900 ft. north of the incline on that level, nine ft. of clean milling ore were found. In the crosscut 100 ft. further north, came first a streak of ore averaging \$10 in value and three ft. in width. Beyond this there was found four ft. of ore averaging \$20 per ton. Still further east there was another streak five ft. wide which averaged \$40 per ton. The whole width of the ore vein was 70 ft. Of the ore cut by the crosscut, 30 carloads were saved which gave an average of \$43.75 per ton. Some of the ore went well into the hundreds, and many assays were from \$250 to \$300. One hundred ft. still further north another crosscut was run, but only a short distance. A diamond drill was then sent ahead and brought out rock which ran from \$5 to \$10 as an average, but showed some good ore.

From the foregoing it will be seen that for 200 ft. along the vein there is ore. The streaks are



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps

Notes from Plumas County.—No. 1.

EDITORS PRESS:—No attempt is made to furnish a full account of the mines of this section. Others on the ground, more familiar with the facts, promise to follow with some very interesting details of several important enterprises, among which are a few rich and unexpected developments.

Sons of your readers will remember the richness of the placer mines at old Elizabethtown, two miles from Quincy; in their palmy days giving support to 2,000 inhabitants. For many years the town and its mines had almost been lost sight of, only a very few remaining, who still had faith in the untold wealth that might be eventually unearthed from the deeper channels or from quartz discoveries in the neighborhood.

Rewards of Perseverance.

Messrs. Laavitt & Loring, after six years of prospecting on the old Elizabethtown channel, have at last been amply rewarded for their pluck and perseverance. Their claim is now yielding \$20 per day to this pick. They have run 6,000 ft. of tunnel and sunk 13 air shafts, seeing, in the meantime, many a dark day and struggling with difficulties well nigh insurmountable from the quicksand and the quantity of water to contend with. When the sinking was retarded by these causes, a long drill was driven down to the drain tunnel and replaced by gas pipe, made into four-ft. sections, allowing a section at a time to be taken off in the tunnel below as the work of driving down the pipe and the sinking continued; in this way keeping the shaft comparatively dry for further progress in their operations.

How a Rich Quartz Lode was Found.

It is now a settled fact, that wherever rich quartz gold is found in the canyons, a good quartz lode may be looked for at no great distance above in the mountains adjacent. Its truth is further confirmed by the late rich strike in Mr. Edman's mine, near Meadow Valley; as also in the famous lake claim of Mr. Heath, 10 miles from Quincy, in the opposite direction, from both of which you may expect to hear more hereafter.

The old Betsy gulch, of Elizabethtown, was particularly distinguished for its richness in quartz gold (one piece found weighing over 100 ounces), leading, as I am informed by Mr. Lewis Bell, to the location of what is known as

The Bell Mine.

Which has since passed into the hands, chiefly, of citizens of Dubuque, and has been incorporated under the laws of the State of Iowa. In accordance with Mr. Bell's statement, red croppings were visible on the surface, the ledge being laid bare finally, after many long years of search, by following up the gulch and sluicing off the sides of the mountain; the quartz of the lode carrying gold corresponding, in every particular, with the quartz gold in the gulch below. The company has a first-class 10-stamp mill, and has opened the mine by two tunnels, the upper 700 ft. to lower 400 ft.—finding good ore in each. It is understood that a quartz nugget was once found in the upper tunnel of 14 ounces, yielding \$100 in gold, and that the mill at one time, in a three-days' run, cleaned up as much as \$1,793, giving evidence of some very rich chimneys in connection with large bodies of lower grade ores.

Very recently a considerable body of what is thought to be very rich ore has been laid open; the pay chute some 20 ft. in width, length not yet ascertained. Quartz of better promise has seldom been met with. The formation is slate and porphyry, and the general surroundings all that could be wished for. The distance in places between walls is 60 ft., the best ore outside of main pay chutes lying along or near one or both walls. If the rich chimneys are followed down and the best ore selected from other portions of the mine, as at present intended, the company has every reason to hope for "a good time a-coming." May they see the day when it will rank among the best-paying mines of the State. They are also prospecting by shaft another lode about one mile from the mill. It is represented as 10 ft. in width, the ore running about \$10 to the ton.

You may expect some account of the mines near Greenville, Plumas county, next week.

A. C. K.

Notes from Shasta County.

EDITORS PRESS:—In my last I said I would give you the facts in reference to the silver ledges recently found in this county. The papers have sparingly spoken of it, but many things I have seen in print are like the stories novel writers tell—hard to believe. Since I wrote you last I have been on the mountain and made frequent assays of the rock found.

There is a peculiar mountain about $\frac{1}{2}$ miles north of Shasta known as Iron Mountain. It has always been regarded as of little value until it should be desired to work it for the iron it contained. But during the last winter a Mr. Sulet, an assayer, had been investigating its

merits, and he made the discovery that it contained large amounts of silver as well as iron. Some of the rock has been brought to this city and is being worked. The mountain is about 3,000 ft. above the level of the sea, and is somewhat difficult of access, but by a trail from Whiskeytown, is comparatively easy of ascent.

The ledges are well defined and of enormous proportions. We approached it first at the discovery claim, where the ledge is easily 150 ft. wide and crops out to the height of 1,000 ft. Where the discovery claim is opened it shows a grand mass of iron and silver. Assays of it have been made of very high figures—from \$10 to many hundred of dollars per ton, so I am told. I have made assays from \$10 to \$115 per ton in silver, and also some gold. I have made no assays of the richest appearing rock. The ledge is plainly visible on the surface for two or three miles, and the belt is all located for four or five miles. Such has been the rush, that prospectors have located everything that had the appearance of anything similar to that rock. There is doubtless a very large and very rich silver deposit here, but to my mind it will be difficult to work on account of the prevalence of iron. The iron is in excessive quantity. Where the discovery ledge or claim is opened there is a curious spring which flows as from a hydrant, coming out in a beautiful jet or stream 2 or 3 inches in diameter; and in the afternoon of each day, about 2 P. M., it commences to flow far more rapidly and this jet rises from the surface to a height of 4 ft. and thus continues to flow for 2 or 3 hours; showing that at its head, or in the mountain, a cavity fills up during the day and night, and, when filled to a certain height, adds additional pressure by the condensing of the air in the cavity, and when it is exhausted the spring flows as usual until a recurrence of the same cause produces the same phenomenon. Many men of means have already visited these mines, and arrangements will be made for their early development.

There is not a gulch or creek in any of the mountains around this part of the country that has not at an early day paid richly in gold, and some of them have shown some silver. The people now are looking up the sources of the precious metals, and very many rich gold ledges are being discovered. A new era will soon dawn on Shasta county.

Shasta Co., Cal., June 23, 1880.

A Great Gravel Deposit.

Not many people even in this community, says the *Calaveras Chronicle*, realize the magnitude of the operations at the famous Eureka hydraulic mine, in this county. It is the largest and best appointed hydraulic company in the southern mines, yet the managers contemplate a colossal enterprise. At the present time there is a force of 40 men employed on the claim day and night; and two "giants" spouting 1,000 inches of water, under a pressure varying from 150 to 300 ft., are thundering away at a bank of auriferous gravel averaging about 40 ft. in depth. No adequate idea of the force of these hydraulics can be obtained without a visit to the mine. To look at the bank it seems impregnable; but as the huge streams of water, with a rush and roar like that of a cataraet, are precipitated against it, the solid gravel melts away like the bank account of a prodigal. Acres upon acres have been washed away, the Calaveras freighting the debris down stream, and yet the claim may be said to be just fairly opened. Practically speaking there is no limit to the bed of gravel, and in all human probability the Eureka will be profitably worked a quarter of a century hence.

Water is supplied by two ditches belonging to the mine. One, five miles in length takes water from the Calaveras, while the other extends to Rich gulch and is supplied from Clark's great canal, via Railroad Flat. From the ditches to the mine the water is conducted in huge iron pipes, solidly riveted together, varying from 11 to 15 inches in diameter. The water privileges connected with the Eureka are invaluable and have much to do with constituting it one of the most promising gravel mining enterprises in the country. The water rights embrace both the Calaveras and Esperanza rivers, sources capable of supplying 1,000 inches of free water the year around. As we have before stated the Calaveras ditch is already dug, and the conduit destined to tap the Esperanza is completed to Rich gulch. A short distance further and it will enable the Eureka proprietors to utilize the waters of the Esperanza in reaping their golden harvest. When it is recollected that the cost of 1,000 inches of water, if it had to be purchased, would amount to something like \$125 per day, some idea of the advantage conferred by free water in a hydraulic claim can be obtained.

But we have not half stated the possibilities connected with the Eureka and its water privileges, neither can we give anything like a pen picture of them within the limits of this article. We will simply say that it is in contemplation to finish the Esperanza ditch to that stream and then continue the canal along down the ridge below the Eureka, ultimately throwing the water on to the rich placers of Pine Peak. All along the line of the ditch, which will traverse one continuous gravel bed from first to last, hydraulics can be established, which with the advantage of free water cannot fail to be remunerative. The enterprise is one of the most promising, attractive and feasible of any ever mooted in this section, and we do not know of a scheme anywhere that can equal it as a practical mining investment.

The Freeland Quartz Mine.

This mine, situated in Clear Creek Co., Colorado, has lately attracted the attention of mining men on this coast by the method adopted to utilize the low-grade ore produced. The concentration works of the company are pronounced to be both efficient and economical, and the *Georgetown Courier* gives this account of the mine and the method of reducing the ore.

The Freeland level, the lowest and main working level of the Freeland mine, is now in over 1,800 ft. horizontally and the breast has reached a perpendicular depth of about 925 ft. There remains about 650 ft. of unexplored ground, at this level, between the breast and the western boundary of the company's property, and when the boundary line is reached the depth gained from the surface will be nearly 1,100 ft. The level is now being driven at the rate of 140 ft. per month, and if the present rate of development is kept up during the coming six months an average of 3,850 fathoms of ground will be opened each month.

The Minnie level, 225 ft. above, is in about 1,730 ft., and 250 ft. from the westerly boundary. The average height of the back-stope of the Freeland level is about 40 ft., and of the Minnie, 20 ft. The ore vein exposed throughout the mine ranges from six inches to three ft. in thickness, and is composed principally of iron and copper pyrites, the amount of galena being too small to justify separation. It is gratifying to note that as depth is gained the quality of the ore is improving. About 20 sacks of picked ore composed principally of erubescite are taken monthly from the mine. [Erubescite is a variegated copper pyrite, of a pale reddish-yellow color, and is composed generally of copper, sulphur and iron; owing to its color the mines of Cornwall call it "horse-flesh ore."] This ore will mill all this way from \$700 to \$1,500 per ton, and runs from 25% to 35% in copper. About 10 tons of first-class ore, worth \$80 per ton, and 150 tons of concentrating ore are mined daily, the product of the mine being limited to the capacity of the company's mill and the old Collom mill, just above Idaho springs, which treats 35 tons per day. By concentration 2 3-10 tons of crude ore are reduced to one ton of concentrate, which is worth about \$60 per ton. Drifting and raising is done by contract at a uniform price of \$3.50 per ft. The etoping is done by men employed by the day, there being 63 men employed at that work.

The general plan for sinking a deep shaft, commencing at the Freeland level, has been definitely arranged. The main shaft is to be 6 1/2 ft. in size, substantially cribbed with 12-inch timbers, and machinery will be employed capable of going to a depth of 2,000 ft. A giraffe capable of holding 12 tons of ore will be used for hoisting. It will run upon T-rails laid upon the incline of the lode, and the ore will be discharged into cars and taken to the mill. The mine has paid its first quarterly dividend of \$50,000, and there is no reasonable doubt but the amount can be kept at that figure.

The Freeland concentrating works are acknowledged to be the best in the State. The mill is situated at the mouth of the Freeland tunnel, and all of the ore from the mine is delivered direct to the mill. The concentrating is effected by 12 Hartz jigs for the coarse ore, and a bundle for the slimes, the expense being 70 cents per ton. The company is contemplating the erection of a 15-stamp mill at the mouth of Trail run for the purpose of treating tailings from the mill, which contain something over \$3 per ton. The process will be to recrush the tailings and reduce them to fine sand, and to then concentrate again in jigs and on buddles.

CONGRESSIONAL WISDOM.—One of the latest, and it may be added, most superfluous, resolutions offered in the late Congress, says the *Engineering and Mining Journal*, was one by Mr. S. S. Cox, to the effect that American capitalists who subscribe to the \$60,000,000 of Panama Canal stock, offered them by the sanguine M. de Lesseps, will commit an unwise and unpatriotic act. Mr. Cox has the reputation of being something of a humorist, and his resolution may possibly have been presented in a Pickwickian sense. On any other presumption the resolution is incomprehensibly unnecessary. The idea conveyed in the resolution that there could by any possibility be any sympathy between capital and any other consideration than profit, must have been intended as a subtle joke.

HIGH RAILROAD SPEED.—In a recent discussion of the question of high railroad speeds, at the Franklin Institute, Prof. Marks stated that he had made some calculations as to the maximum speed at which locomotive engines could be driven before the centrifugal force on the tires of driving-wheels would become so great as to cause them to burst. These calculations, which were approximate only, gave a limit of speed in the neighborhood of 150 miles per hour; of this, 78 miles, or more than half, has already been attained.

A SMALL LOCOMOTIVE.—A diminutive locomotive has been constructed at Pittsburg, Ohio, for Arizona. The cylinders are only six inches in diameter; and the engine, which will draw 150 tons on a level, is intended to haul gold and other ores from the mines to the melting furnaces of its owners, Messrs. Frendenthaw & Co., a distance of four miles.

Low-Grade Ores of the Comstock.

Undoubtedly the working of the large areas of low-grade ores of the Comstock should be undertaken. The working of such ores would give employment to a host of miners now idle, and would give to the world millions of dollars in gold and silver now lying in the old levels and croppings of the Comstock. The working of these ores is again being advocated by the press of San Francisco. It is thought the Miners' Union should appoint a committee to confer with the mine managers in regard to the labor situation, and so arrange matters that members of the Union would be allowed to work at points above this level of the Suto tunnel at \$2.50 or \$3 per day, or at rates of wages in accordance with the character of the ore extracted. We desire as much as any one in San Francisco to see the business of working our low-grade ores commenced, and have advocated the trying of the experiment from the first; but the inauguration of the work does not lie with the Miners' Union. The first thing to be done is to put up proper mills and works for the concentration of low-grade ores. Let this be done, and an arrangement will speedily be made for furnishing ore for such works.

Should the Miners' Union hold a meeting tomorrow, and say that half their members, or as many as are now out of employment, would be allowed to go to work at taking out low-grade ores, there would be no one to give any of them a day's work. This being the case, it is not likely that the Miners' Union will at present pay any attention to the matter. However, let men of capital start in and put up proper works for the reduction of our low-grade ores, and show that they will be able to give employment to 1,000 or 2,000 men, and then something will be done.

Should the erection of works be commenced at once it would probably be nearly a year before there would be a demand for miners to take out ores for concentration. This being the case, no one need expect that the Miners' Union will call a meeting and reduce wages in advance of the demand for men. Should they be asked to do so, they would feel that there was some trick in it, and, knowing that once wages are knocked down it is no easy matter to bring them up again, would have nothing to do with the business.

It would be commencing at the wrong end. The mill first, and then the men to keep them supplied with ore. An arrangement for mining the low-grade quartz can doubtless be made. The fairest way for all concerned may yet be found to gauge the wages of the men in accordance with the amount of pay that can be obtained from the ores worked.

Thus far all is talk. If any man or company of men intend doing anything with the low-grade ores of the Comstock, it seems to us the first move should be to begin experimenting in the concentration of low-grade ores. For this preliminary part of the business temporary experimental works should be erected, and samples from areas of low-grade ores in the leading mines should be taken out and worked, or such samples should be sent to the best concentration and reduction works now in operation anywhere in the United States or Europe. Something of this kind certainly should be done before erecting the large and costly works that would be needed for working the low-grade ore on the grand scale that would be required.—*Territorial Enterprise*.

HOW OUR FORESTS DISAPPEAR.—The manufacture and shipment of timber is a leading industry in western Washington Territory, employing a great many workmen and an immense number of large saw mills, operated by steam and water power. A large fleet of ships and some small exporting steamers convey the timber to San Francisco, East Indies, Europe, Australia, Egypt, South America, Japan and China. The timber shipped from one district in western Washington (Pugnet Sound), in 1876, by vessels, without reckoning home consumption, equalled 40,000 railway carloads, or 2,000 railway trains of 20 cars each, and 1878 amounted to 250,000,000 ft. Timbered lands, well situated for logging purposes, sell at \$8 to \$12 per acre; three miles from a river timber lands can be had at \$2 to \$3 per acre.

HONORS TO AN AGED CHEMIST.—The chemists of Germany are collecting money for the purpose of presenting a gold medal to Prof. Woehler on his 80th birthday, which will be July 31, 1880. Prof. Woehler is one of the most distinguished, as well as the oldest, of living chemists. Himself a pupil of old Berzelius, a contemporary of Liebig, and the loved instructor of many of our best chemists, his name is equally respected on both sides of the Atlantic. Prof. Jay and Chandler, of Columbia College, New York City, two of his former pupils, are receiving contributions from those who wish to join in this well-deserved memorial.

A BIG BLAST.—The big blast at the Blue Tent diggings, that has been so much talked of during the past week, was fired off July 2d. The charge consisted of 1,542 kegs of powder, at 25 pounds to the keg, making in all 38,550 pounds. This firing was done by electricity. The result was a very successful one. The bank which is 238 ft. perpendicular, was torn away for about 150 ft. back, and 200 ft. wide. It is believed that this is the largest piece of ground torn from its foundation in one blast that has ever taken place in California.

MECHANICAL PROGRESS.

Improved Flour-Mill Machinery.

Until recently it was believed that the only thing to be sought for in the production of a good article of flour was a more or less fine disintegration of the kernels of wheat. As long as millers held to the theory that "grinding" was all that was required, a large percentage of the flour had its nutritive powers greatly reduced by being ground to an impalpable dust. Science, by aid of the microscopes, has shown that no really good bread can be made from flour in which any large portion of the starch globules have been thus broken down. The rising of bread is due to the starch globules which remain whole, while the dust from the disintegrated ones, by souring, impairs the lightness and sweetness of the loaf. It is but recently that these facts have been made known to millers, and since that time they have been discarding their old theories and machinery, and devising improvements with the view to separating the starch globules, rather than pulverizing them. Another important advance in this industry consists of an improvement in holting machines. Until recently the bran was separated from the flour by a powerful air-blast, which blows off the light particles of bran. Considerable power is required for this process, and although it is carried on in a closed room, there is not only a great waste of the finer particles of flour, but the impalpable dust penetrates every part of the mill, and often gives rise to destructive explosions. By a recent invention, electricity is made to take the place of the air-blast. Just over the wire bolting-cloth, which has a rapid reciprocal motion, a number of hard rubber cylinders are kept slowly revolving and rubbing against strips of sheepskin, by which a large amount of frictional electricity is evolved. Then, as the middlings are sieved by the reciprocal motion, the lighter bran comes to the top, whence, instead of being blown away by an air-blast, it is attracted to the electrically-charged cylinders, as light substances are attracted to a piece of paper, or a stick of sealing wax, which has been smartly rubbed. The removal of the bran from the rollers and its deposit on one side are readily effected, while the flour is carried in another direction. The separation is thus made complete, with very little loss or dust. Still another device has also been introduced to remove from the wheat, before being ground, small pieces of iron, which, despite the utmost care, will find its way into the grain, working great injury to mill machinery. This trouble is now remedied by the use of a series of magnets, directly under which all the grain is made to pass. These magnets readily capture all the stray pieces of iron from the wire hands used in hindlag; and they have also revealed the singular fact, that, of the scraps of iron and steel which find their way into the grain, fully one-third are something besides the hindling wire. They are of larger proportions, of varying character and much more harmful to the machinery than the wire. Thus it is that science is constantly coming to our aid in all our varied industries, lightening the labor of the workman, decreasing the cost of products, and in every way improving all the various processes which are involved in the improved and constantly advancing civilization of the age.—*Californian for August.*

Railroad Car Wheels.

There appears to be no record which shows the first form adopted for the flanges of railroad wheels, nor of the shapes which they have gradually assumed. Wood's treatise on railroads and Pambour's book on locomotives contain sections of tires, the form of which does not differ materially from those now in use. These were published in 1836 and 1838. The fact seems to be that the present shape of flanges and also of rails has been assumed to be right without any good or sufficient reason for it, excepting that it worked well in practice. In other words, there are no adequate reasons for inferring that the present form of wheel flange is the best that is possible. It has been adopted empirically, and there is no sound theory to recommend it. It seems quite within the range of possibility that an elaborate investigation might indicate some important and valuable modifications in the form of these very important parts of all railroad vehicles.

There are more than 10,000,000 car-wheels in use in the United States, the average life of a wheel is eight years, and it requires a little over a ton of pig iron to make four wheels. Hence, assuming that the number of wheels in use is even 10,000,000, it requires 1,250,000 new wheels to replace those worn out each year, and to make these over 312,500 tons of pig iron are required. As 1,250,000 wheels are worn out each year, and as the average weight of a worn out wheel is about 515 lbs., something like 287,389 tons of this old material are available for remanufacture. The difference between this sum and 312,500—the approximate weight of the new wheels—shows pretty correctly the number of tons of new material consumed per year in the manufacture of car wheels, assuming that all the old wheels are manufactured into new ones. The difference is 25,111. The life of a car wheel is, however, growing shorter, for

two reasons: 1. The increasing weight of a carload, this load on some roads now being double what it was a few years ago; and second, better management and improved loading and unloading facilities, by which the wheels are kept moving more continuously than formerly. As an instance, a train loaded with petrolsams can be unloaded at New York in a very small fraction of the time required before the excellent facilities for discharging were provided. Manufacturers guarantee wheels to run from 50,000 to 60,000 miles, but they not unfrequently greatly exceed this.

AMERICAN PLATE GLASS.—The manufacture of plate glass is quite a new industry in this country. There are as yet but four companies in operation. The Pioneer and the largest works of the kind is located at New Albany, Indiana. It occupies 20 acres of ground, and employs \$1,000,000 of capital. Connected with the works, and under the same management, is another, known as the De Pauw Plate Glass Works, with a capital of \$750,000. These two establishments give employment to upward of 1,000 persons. The Ford Plate Glass Works, at Jeffersonville, is operated by a capital of \$600,000, and the Crystal City Works, near St. Louis, employs a capital of \$750,000. This industry is an important one, and as yet furnishes but a very small portion of the plate glass consumed in the country. That it is profitable may be inferred from well authenticated reports that the most strenuous exertions have been made, by importers and foreign manufacturers, to crush out the business of home manufacture. It is said that efforts have been made, by a combination of those interested in the foreign manufacture, to purchase all the American factories, with a view of tearing them down, and establishing a monopoly of the business in the hands of the foreign manufacturers. Large sums of money, it is also said, have been spent in sustaining a strong lobby at Washington, to bring about either a material reduction or a total abrogation of the tariff on foreign plate glass. It is to be hoped that a business of so much and such growing importance will be fostered by the Government until it shall be able to take care of itself, an advantage which, under proper auspices, it will reach in a very few years.

ELECTRO-DEPOSITION AS A SUBSTITUTE FOR CASTING.—We find, in *London Nature*, an interesting reference to the process of electro-deposition, which, in the hands of an electro-metallurgical company of Brussels, promises to become a practical substitute for casting in the production of bronze statuary. Our contemporary confirms our previous statement that this company had succeeded in producing a colossal statue of Van Eyck by the deposition of copper electrically upon the clay model. The same authority notices a simple procedure by which the production of bronzes on the small scale may readily be carried out. Take any plaster figure or group, boil in stearins, then coat well with black-lead, and place in the copper bath as in ordinary electrotyping. Attach a very weak battery, and deposit very slowly a thin coating of copper. Then remove from the bath and bake in an oven until the plaster model shakes out in dust. There remains now only a thin copper shell of the model. Varnish this on the outside to prevent further deposition there, and replace in the bath, with a much stronger battery power. The copper will now deposit on the inside, and when the same becomes thick enough, the process is finished.

A somewhat remarkable machine is described in a late French technical journal. It is called a "profilograft," because when in use it traces mechanically on paper the outlines of the ground over which it travels. It is described as a small carriage, mounted on two wheels, drawn by one man, and attended by another who marks the levels at the proper places; and underneath hangs an iron rod, with a large ball at its lower end, serving as a pendulum. This pendulum maintains a constant vertical position, while the machine inclines in one direction or the other according as it ascends or descends a slope. To the upper end of the rod is fitted a pencil, which marks on a sheet of paper the ups and downs of the country traversed, whether on an ordinary road or across trackless fields. The exact profile is thus recorded to a given scale. At the same time one of the wheels, acting on the part of chain bearer, measures and indicates the distance traveled throughout the survey. For surveyors and others engaged in leveling operations, this machine would appear to be eminently serviceable, and there is talk of its being made use of in a new general survey of France contemplated by the government.

COMPRESSED AIR AS A MOTOR.—This question of the economy of the use of compressed air as a motor, is about to be tried on an extensive scale at Rochester, N. Y. A large company has been formed in that city, which has purchased an extensive water power to be utilized in compressing air, which will be conveyed in pipes to the various manufacturing establishments and machine shops of the city, to be used as a motor in place of steam. It will also be used for the propulsion of street cars.

TO CUT SHEET BRASS.—Moderately thick plates may be cut chemically by drawing a line or mark with a solution of mercury in nitric acid. The acid attacks the copper, while the mercury amalgamates with the zinc; this seems to be the explanation; at any rate, the brass becomes as brittle as glass on the place where the line is drawn, and is easily broken off.

SCIENTIFIC PROGRESS.

Lightning and Oil Tanks.

The frequency with which the large oil tanks in the oil regions of Pennsylvania have lately been struck by lightning, and the immense losses of property thereby entailed, has elicited much discussion, both in regard to the inciting cause of such destruction, and also in efforts to reach some reliable means for averting such occurrences. Whenever a thunder-storm passes directly over one of these tanks it seems devoted to destruction, and millions worth of property has thus been destroyed. No practical safeguard has yet been suggested. The most approved rods placed upon masts far above the tanks, and completely surrounding them, and also well grounded in the earth, seem to be useless, although affording almost perfect protection under other circumstances. It is well ascertained that the mass of iron present has nothing to do with the attraction of the electrical discharges. The *Scientific American* has given what appears to be the most reasonable explanation, as follows:

"From every oil tank, according to our theory, there is a constant escape of light hydrocarbon vapor, which forms a permanent cloud or column, rising to a great height above the tanks, far above any rod that could be erected. This vapor rod is a conductor, which the lightning naturally follows, sets on fire the vapor, and explodes the tank. A column of heated air or vapor rising from a chimney is well known to be a conductor for lightning; the rise of hydrocarbon vapors is illustrated by the balloon. If the theory we have outlined is correct, the remedy for the electrical explosion of oil tanks is to be found in such treatment of the oil, or such a construction of tank, as shall prevent any escape of the light vapors."

The *Iron Age*, in noticing the above, says: "This column of vapor rises only from tanks with wooden tops; or, in other words, an iron-top oil tank is never struck by lightning. This is a remarkable fact, and points out the remedy against the origin of these fires. We have carefully watched them, and speak from positive knowledge of all tank fires that have been caused by lightning during the past seven years, except the one at Titusville early this month, and we state with confidence that an iron-top tank has never been struck by lightning. Of the Titusville fire we have no positive knowledge on this point, but, judging from the locality and the size of the tank struck, we should say that it was a wooden-top tank. There is also one case, we believe, in which an iron-top tank was fired by lightning, but in this case the lightning struck a pipe leading to the tank at a point some distance from it. In a word, the remedy for these oil fires caused by lightning seems to be the changing to iron of all wooden-top tanks."

NEW METHODS OF USING VOLATILE DISINFECTANTS.—In the Parkes Museum of Hygiene, at London, there are two appliances for charging the air of a room with antiseptic vapor. One consists of a miniature "round towel" circulating on two rollers, the lower of which rests in a trough filled with a solution of carbolio acid or any other soluble disinfectant. The other apparatus consists of a metal box filled with Norwegian tar. The lid of the box is provided with metal laminae, which are immersed in the tar. When the apparatus is to be used the cover is raised, and the tar-covered laminae are exposed to the air. The pleasant odor of the tar is very quickly perceptible throughout the room. A tube is fitted to the box, also, which enables it to be used as a simple inhaler, and on applying the mouth to the end of the tube, and drawing an ordinary breath a very perceptible dose of the tar-vapor is obtained.

PROGRESS OF ELECTRIC LIGHTING ABROAD.—The Brush electric light has been introduced into the South Kensington Museum, in London, and the results are very satisfactory. The experiment has been tried in the hall containing the new fresco by Sir Frederick Leighton, P. R. A. There are eight lamps, three suspended on each side and two in the central line, so that the light is equally diffused. The use of the electric light is spreading. The Victoria docks and Holyhead harbor are to be lighted by electricity. The Royal Navy is adopting Brush's light. Siemens's light has been introduced into the Siam Dispensary, Bangkok, as a rival to Jablochhoff's. The arrival of summer has brought with it a discontinuance of the Siemens light in the reading-room of the British Museum until next autumn. The authorities regard it as a good success.

THIN ROLLED IRON FOR SCIENTIFIC PURPOSES. In experiments made at the Allghany observatory, by Prof. Langley, on the measurement of radiant heat, he made use of a thermo-electric apparatus, a product of the American iron industry. Observations made with such instruments have shown that iron in extreme thinness is the most suitable material to be used with them, and in order to supply this demand the Pittsburgh mills have succeeded in manufacturing rolled iron which is so thin that from 10,000 to 12,000 sheets laid on each other equal only one inch in thickness. An instrument made out of this material has almost the same responsiveness to radiant heat which the eye has toward light.

A NEW NEBULA AND A LOST PLANET.—Dr. Temple, of the Observatory of Arcetri, Florence, announces his discovery, on March 14th, of a new nebula, which he at first mistook for a faint comet. Its position for 1879 is R. A., 11h. 18m. 5s., N. P. D., 86° 1' 4". Dr. Temple describes it as a double nebula, with two small but distinct nuclei from 15" to 20" apart, and has added that nebula Herschel II. 32, which is in the vicinity, is much smaller and fainter than the one just discovered. It occasionally happens that celestial bodies are lost as well as found. This has occurred several times in the case of the small planets between Mars and Jupiter, which now number nearly 200. There is one of these, however, which, according to Mr. Proctor, astronomers would regret to lose. This is the planet Hilda, which travels in a much wider orbit than any of the others, and can give more exact information respecting the mass of Jupiter than any other member of the solar system, coming much more fully at certain times under his influence. Unfortunately, Hilda has been searched for in vain at its first return to opposition, and astronomers begin to fear that the planet is, for the time being, lost.

ARTIFICIAL VANILLA.—The production of any well-known substance artificially by the synthetic chemist, is generally viewed by the public with opposition, until convinced that it is identical with the natural product. A German paper produces an indorsement of artificial vanilla by Prof. Meidinger, who says it possesses undeniable advantages over natural vanilla. The latter loses its aroma, is unequal, and the natural bean only contains 2% of valuable material, with 98% of worthless or even injurious material, of which the removal is troublesome and tedious, before the pure flavor can be obtained. In Germany the vanilla is mixed with sugar, and put in packages of different strength for different purposes. That for chocolate manufacturers is 70 times as strong as good vanilla; that for family use is put up in packages equal to one bean, and sold at nine cents each; that for liquor manufacturers 2% of vanilla. Dr. Meidinger speaks very highly of this artificial vanilla, which he pronounces perfectly wholesome.

GLYCERINE CEMENT.—According to *Dingler's Journal*, Prof. Morawski finds that the cause of the hardening of glycerine cement is the formation of lead glycerine, a salt of glycerine and lead oxide. This crystallizes in fine needles, and is formed according to the following equation: $C_3H_5O_3 + PbO = C_3H_5PbO_3 + H_2O$. The greatest hardness is obtained by adding 5 cc. of glycerine to 50 grammes of litharge. If more glycerine is used, the mass solidifies more slowly, and never gets so hard. To obtain a quickly-hardening cement, two volumes of water should be added to five volumes of glycerine, and 6 cc. of the mixture incorporated with 50 grammes of litharge.

SCIENTIFIC PRIZE AWARDS.—A committee appointed in 1876 and presided over by M. Dumas, have reported to the French Chamber of Deputies in favor of granting the first Volta prize of 50,000 francs to Prof. Graham Bell of telephone fame, and the second prize of 20,000 francs to M. Gramme the well-known inventor of the dynamo-electric machine bearing his name. The first one to receive this distinction was Ruhmkorff.

SCIENCE AND COMMON SENSE.—"Common sense," says Prof. Huxley, "is science exactly so far as it fulfills the ideal of common sense; that is, sees facts as they are, or at any rate without the distortion of prejudice, and reasons from them in accordance with the dictates of sound judgment. And science is simply common sense at its best; that is, rigidly accurate in observation, and merciless to fallacy in logic."

"SALICYLIC" OR "SALICILIC?"—The *Louisville Medical News* raises the question whether the current form *salicylic* is consistent with its derivation from the Latin *salix*, the genitive of which is *salicis*. Clearly the spelling should be *salicilic*, after the analogy of *salicine*. It is not easy to understand how the other orthography could have arisen.

THE SUN'S SIZE.—The huge size of the sun, as compared with the earth, may in some degree be realized by this construction of a very simple model. When we take a ball of three inches in diameter as representing the sun we have to place 30 ft. from it a minute ball of 3-100th of an inch in diameter, representing the earth and its distance from the sun.

MAGNESIUM IN STEEL.—A half per cent. of magnesium changes coarse-grained into fine-grained steel and greatly improves the quality. The magnesium is introduced through an opening in the cover of the crucible, after inserting some small bits of charcoal, in order to remove the free oxygen. Without this precaution there would be danger of an explosion.

If the authority of foreign scientific journals is to be accepted, certain water beetles have been found living in reservoirs containing a concentrated solution of sulphate of soda; the liquid proved rapidly fatal to fishes.

Sulphur crystals may be obtained by dissolving sulphur in hot concentrated acetic acid, and evaporating the solution at ordinary temperature.

M. GAUTIER states that the tannin of Chinese galls is chemically distinct from that found in Aleppo galls.

States—an average of almost one postoffice to every 1,000 inhabitants, which speaks well for our public means of inter-communication, placer minings will foot up between \$25,000 and \$30,000. None but Chinese are engaged in this industry there.

river, a distance of about 35 miles from here, out of which a sufficient quantity of gold and silver ore has been extracted to give a good general idea of its merits; the result being as follows: Gold, per ton, \$5; silver, \$25; and copper, 7%.

KARVILLIUM IRON.—Harley & Co. are getting ready to put their mill, that stands on the east side of the river, in operation. The ore will be sent down to this mill from the Mineral Hill mine by means of a Wise tramway 14 miles long.

MARIPOSA.

Rich Strike.—*Gazette*, July 10: Wm. R. Carson & Co. have made a rich strike on Temperance creek, in Hunter's valley, near the old Oakes & Reese mine. This was formerly known as the Hammerstrand copper claim. They have taken out \$5,000 or \$6,000, and the mine still continues to pay handsomely.

MONO.

LAKE DISTRICT.—*Mammoth City Herald*, July 3: In the Mammoth main tunnel in No. 3 has been advanced 45 ft, making a total of 1,074 ft. The upraise from this level has extended 20 ft, making the total height about 60 ft. The mill started up to its full capacity on the 1st inst., with 40 stamps, the water machinery being run by water power alone, with supply sufficient to run the 40 stamps, 16 pans and 3 settlers, with quite a stream flowing through the waste ditch. The mill is crushing from 75 to 80 tons daily. There is an accumulation of about 400 tons of ore at the mill from tunnel No. 3.

H. L. & M. C. JOSEPHSON.—The hard character of the rock encountered during the past few weeks in this tunnel has given place within a day or two to a softer formation, and henceforward it is expected that better headway will be made. The ground is now drilling and breaking much better.

NOTES.—The Lisbon, Last Chance, Merrimac and other mines on the south of old Mineral Hill are fast turning out first-class gold mines, upon several of which there are rich strata. In a short time this short tunnel will strike the rich ore bodies for which it is run, and in all probability a mill will at once be erected on the property. Daily we hear of new finds being made in some of the old locations upon which assessment work is being done.

PAZCOST DISTRICT.—Jake Holsinger has shown us some rich specimens of rock from this district. The ledges from which the rock was taken are said to be large and of fine, easy access, with wood and water in the greatest abundance.

NOTE.—At the head of Bloody canyon Messrs. Hayt & Fuller discovered, last summer, some very large ledges of antimonial silver which assayed up in the hundreds, and upon which they intend doing work this season. Operations will also be commenced on several other claims by responsible parties.

NEVADA.

A NEW CLAIM.—*Transcript*, July 4: Messrs. Richards, Johns and Jenkins have started a mining tunnel on Deer creek, between the Merrimac and Mountaineer locations. They have been at work there for 5 or 6 weeks past, and are running for the same ledge on which the Spargo mine is located. They expect to strike it within a few ft further.

DERBEE CLAIM.—We learn from good authority that the Derbee has produced about \$15,000 worth of gold during the last month, and the gravel looks better than it has at any time since the mine was opened. The prospect of a dividend to the stockholders is very favorable at the present time.

EUREKA NO. 2.—There are about 100 tons of ore on the dump at the Eureka No. 2, situated on Little Deer creek, 3 of a mile east of this city. The 4-stamp mill has been running constantly till within a week, when it was shut down to admit of the ditch being cleaned. It will start crushing again Tuesday. The ledge, which has an average thickness of 12 ft, is worked by a tunnel, and pays from \$8 to \$8 per ton, besides the sulphurets.

NEVADA CITY MINE.—*Transcript*, July 9: This company is making arrangements to put 2 more Frue concentrators in the mill next week, when the full complement of 10 stamps will be started to crushing, the 5 now in use not being sufficient to dispose of the ore as fast as it comes out. Yesterday the 24 level produced some of the finest ore yet found in the mine. Several of the large specimens brought to town showed heavy streaks of free gold, besides a great deal of galena. There is probably not a very extensive deposit of such quartz in the mine, but what is found from time to time will likely pay at the rate of from \$20,000 to \$30,000 to the ton. The miners are taking out considerable sulphurets ore that is very rich.

LAKE VALLEY MINE.—For 3 years past, S. P. Dewey, of San Francisco, has had a force of men engaged in running a tunnel at Lovell hill, 15 miles east of this city, penetrating the hill a distance of about 1,000 ft. The expense of the prospecting done has not fallen short of \$30,000. A few days since an extensive deposit of gravel was found for the first time, and what is better, we are informed that it is very rich. The channel developed is the same one from which the Swamp Angel company has been realizing a heavy profit for 10 months past.

IDAHO.—*Grass Valley Union*, July 8: The yield of the Idaho for the month of June was \$41,500. The product of the mine has shown a marked increase in the last 3 or 4 months, and the appearance for the future is excellent.

PLACER.

CONRAD RICH ORE.—*Herald*, July 0: George Macombe has in his show-window a chunk of quartz rock less than a man's fist, from the Conrad mine, on Duncan hill, now being worked by the Messrs. Roberts, which is very rich in gold. It is estimated by some to contain over 3 ounces of gold. Mr. Macombe informs us that over \$700 worth of specimens from this same ledge has been sold to jewelers.

PLUMAS.

EALE OULON.—*Cor.* *Mountain*, July 3: The quartz mines at Eale Oulon district, near alternating public attention are all found on the Diadem ledge, a large ledge running through the center of the district, with a general direction of northwest and southeast, and a dip of about 60° to the northeast. The ledge is generally much decomposed, the veinstone being magnesian limestone, intersected by innumerable veins of quartz and by veins and masses of talcose rocks. The decomposition of the limestone has changed the ledge into a soft body of yellow and red material which generally contains free gold through its entire mass. The chief explorations on this ledge have been made in the claims of the Diadem mining company, in which the ledge formerly was covered by a gravel deposit, worked since 1854, and noted for its richness in coarse gold.

DIADYM.—Late last fall the owners of the Diadem found excellent prospects on the surface of the ledge, and early in the spring a short tunnel was run, striking the ledge at a depth of 25 ft. Adjoining the footwall a narrow body of quartz, mingled with talcose slate, was found of extraordinary richness, the lumps of ore in many instances being 1/2 gold, while next to this streak, soft quartz, averaging 2 ft in width and estimated to contain \$30 per ton, follows the direction of the footwall.

SIERRA.

SAVAGE PLACER.—*Mountain Messenger*, July 10: The tunnel has passed through the hard white rock (a mixture of quartz and granite) and entered a slate formation which is much softer. The recent rich strike in an adjoining claim was made at a point about 400 ft east of the east line of the Savage Placer, in what is supposed to be an overflow from the main channel that passes down through the ridge. At a proper point in the slate rock the Savage Placer folks will make an upraise to the gravel.

DOWNVILLE QUARTZ.—*Cor. Messenger*, July 10: Since my last I have found several new prospects; one a ledge 20 to 25 ft thick west of the main ledge, and on the east it will average 16 in. I think it will yield about \$8 per ton. The gold is fine and is chiefly in the sulphurets. As far as surface indications go, it is the most promising mine that was ever struck in this vicinity, and I think when this range is thoroughly prospected and opened for work, that it will be to Downville what the Buttes is to Sierra City.

TRINITY.

MONTE CRISTO MINE.—*Journal*, July 3: Some of the richest quartz in the State is now being found in Trinity county. One day this week Fred Diener founded up a pound and a half of rock from the Monte Cristo mine at Deadwood and obtained 2 ounces of gold, lacking only \$1.

TUOLUMNE.

CLIO MINE.—*Cor. Independent*, July 7: This claim is located on the mother lode, the same on which the Rawhide Ranch, Jamestown and Quartz Mountain mines are located. The mine is fitted up with a 10-stamp mill and other appliances for the reduction of ore. We understand that this is in the Eastern market.

NOTES.—Jim Diroll, in company with a number of enterprising quartz miners, are opening out a new vein near Stevens' ferry. They have already found some very flattering prospects. The quartz interest in this locality, like many other parts of the county, is assuming considerable shape, and is paving the way for a system of operations on a larger and more extensive scale than is seen at the present day.

WATERS MINE.—*Independent*, July 10: Sulphuret works are being constructed at the Waters mine, Tuttle town. It is expected the furnaces will be ready in about 3 weeks. The width of the vein is not known, as a cross-cut of 22 ft has not yet found the opposite wall. The ledge carries 15% of sulphurets right along, which yield from \$75 to \$85 per ton. The 10-stamp mill is a model piece of workmanship, and crushes, on an average, 19 tons in 24 hours.

NEVADA.

WASHOE DISTRICT.

SIERRA NEVADA.—*Gold Hill News*, July 10: On the 2400 level the north drift has been advanced 35 ft; total length, 980 ft. On the 2300 level the west drift has been advanced 16 ft; total length, 258 ft. At this point the drift was continued and the work of cutting out a chamber for an upraise commenced.

USAR CO'S DRAIN.—In being cut in the main south drift on the 2300 level. On the 2500 level the south drift has been extended 9 ft, the face showing quartz assaying from \$2 to \$20. The northeast drift from the Union shaft, on this level, has been extended 25 ft, and the south drift from the same point has been extended 30 ft.

MEXICAN.—On the 1000 level the joint Ophir east cross-cut has been extended 30 ft. On the 2300 level west cross-cut has been extended 14 ft. On the 2500 level the joint Ophir east cross-cut has been advanced 37 ft, and the north drift 55 ft.

ORINA.—On the 1000 level the joint Mexican east cross-cut has been extended 30 ft. On the 2000 level the main south drift is being cleaned out to the California line. On the 2500 level the north drift has been extended 10 ft, the joint Mexican east cross-cut 37 ft, and east cross-cut No. 1 9 ft.

HALE & NORCROSS.—Have sunk and timbered the incline 15 ft. No work has been done on the 2100 level. There are 243 tons of ore on hand; average assay, \$40.77.

BELCHER.—The north drift on the 3000 level has reached the Crown Point line, where it has been stopped. Connection will be made with it from the Crown Point side. The distance which the Crown Point east drift must be run to make the connection is 100 ft.

CALIFORNIA.—During the past week 243 tons of ore have been extracted and sent to the mills from the 1650 level. On the 2300 level the north drift has been extended 13 ft.

CON. VIRGINIA.—During the week there have been 600 tons of ore extracted and sent to the mills from the slopes on the 1750 level. On the 2000 level a chamber is being excavated for the joint Best & Belcher winze.

AURORA DISTRICT.

PROSPECTUS.—*Emerald Herald*, July 10: A contract was let Thursday to extend the tunnel to the footwall, calculated to be about 30 ft distant, making the ledge matter a width of 130 ft, all in paying ore. A contract was also let to extend the south drift several hundred ft on the main ledge. Good judges of ore estimate that the ore taken from this drift will not fall short of \$100 at the present time, and better ore will no doubt be found as the drift attains depth.

ROBERT ENNETT.—Yesterday a contract was let to extend the shaft 50 ft deeper. There is good ore in the shaft from top to bottom.

CENTENNIAL.—The work of extracting ore goes steadily on. Both shafts have out several tons of rock that will go away in the hundreds.

TUC. EMERALDA.—About 25 tons of first-class ore has already been extracted. Assays range from \$100 to \$1,000 per ton. The work of taking out ore will continue.

NORTHERN BELLE.—The shaft is now down 50 to 65 ft; sinking on the ledge. Rich ore from the top to the bottom. Several men will be put to work in a few days taking out ore.

GRAND FRANK.—This company has instructed Mr. McIntosh to let another contract to crosscut their ledge, and he expected to have to run 50 ft before striking it, but was agreeably surprised by finding quartz the first 3 ft run.

BRISTOL DISTRICT.

NOTES.—*Pioche Record*, July 3: The managers of the Bristol company are now pushing the work along rapidly at the mill site. The battery pans and settlers of the mill are already in position, and work of putting up the frame will commence next week. The sinking of the artesian well is progressing as usual. An important development has lately been made in the Hillside, on the 5th level east, which is very promising. The Hillside furnace is still in steady operation and working through a large amount of ore. Work has already commenced on the Mayflower mine of the Bristol S. M. Co.

CHERRY CREEK DISTRICT.

TEACUP AND GENEVA.—*White Pine News*, July 3: Prof. Herr, of New York, after examining the record of these mines, started for Cherry Creek, where he is to meet Prof. Newberry, and a sale of the mines will probably be made. Both of these mines have always been considered among the best in the district. The Teacup alone has produced over \$500,000. The new company will develop the mines on a large scale, and no doubt will before the end of the present season be more than reimbursed for their outlay.

COLUMBUS DISTRICT.

LUCKY HILL.—*True Fissure*, July 10: The winze is now down 160 ft, with favorable ground still in ledge matter. The crosscut south from the 110 level is in 30 ft, with the face in good ore. A hoisting engine for the winze has been purchased, and will be sent to the mill without delay. Mr. Baldy, who returned to San Francisco from Candelaria, pronounces the Lucky Hill prospect the most promising in the district.

NORTHERN BELLE.—There is no particular change in the mine, with the exception that a fine body of ore has been opened on the 9th level. It averages 3 ft in width. Both mills were again started up this afternoon and will run on full time.

SARAH JACOBSON.—The lightning incline crosscut southeast on the 150 level is in 35 ft and in good ore. Work on the silver incline has been discontinued until connection will be made by the crosscut from the lightning incline.

VICTOR.—Sinking is still progressing. The ledge in the bottom is 7 ft in width and still carries the same character of material as before. The windlass and derrick are now in position, being pushed ahead, and is now in 750 ft.

MOUNT PORT.—Nearly 400 tons of ore have been shipped to Belleville, and the ore-house there being filled, further shipments have been discontinued until milling begins.

NORTH NEW ENGLAND.—The ore improves as depth is attained, though not much work has been done in the bottom, owing to fitting up the mill. The shaft has been advanced 10 ft. The tunnel has now reached a distance of 113 ft. Some rich streaks of ore are now being cut, and in going 10 ft further it is expected the main ledge will be cut. The ledge croppings stand out boldly about 25 ft in height on the surface, the assays from which are very encouraging.

CAMPBELL DISTRICT.

NOTES.—*Silver State*, July 10: According to report the new mill in this district is temporarily shut down, owing to the fact that the ore is too base to work without being roasted, and an effort to concentrate it proved a failure. We understand that roasting furnaces are to be put up there at once, as the ore carries silver enough to pay well if it can be saved.

DUN GLEN DISTRICT.

LANG SYNE MINE.—*Silver State*, July 10: A note from Dun Glen informs us that the white miners at the Lang Syne mine have been supplanted by Chinese. Some white men who have been at work in the mine and have families in the camp, are said to be hard up for the necessities of life. It is greatly to be regretted that Chinese should be employed in any mine these days, when there is a glut of white labor in the market.

EUREKA DISTRICT.

REMY-HENDERBERG.—*Sentinel*, July 10: During the month of June, the Remy-Henderberg company shipped about 600 tons of ore to the Richmond works, which yielded some \$20,000. The mine still continues to look good and bright. The present month will probably make as good a showing as the last. All old encumbrances have been removed from the company's property, and we understand they have a very respectable bank account.

RICHMOND CO. This company yesterday commenced breaking ground for the erection of a new foundry. The immense amount of castings used by the company, and the great quantity of iron at their command, otherwise useless, has induced them to construct a foundry of their own. It will make a great saving to the company.

EUREKA CO'S.—*Official Letter*, July 3: The mine is looking well, with plenty of ore to run both furnaces. The ore-bins are all filled, both at the mine and furnaces. Have made better progress this week with the new shaft. Both furnaces are running smoothly, and producing the usual amount of bullion.

PHILADELPHIA DISTRICT.

BELMONT.—*Cor. Courier*, July 3: The drift started south from raise in north part of mine was advanced 14 ft during the past week through some rich ore. We started a drift going north from this raise, which is showing from 18 inches to 2 ft of ore; vein 4 ft thick. Our raise from end of west crosscut was advanced since last report 11 ft through vein matter and quartz. The ledge is getting more solid and free from slate as we advance, and I am in hopes of soon getting ore.

BELMONT.—*Official Letter*: Have made 15 ft in main tunnel. Ground solid and seams with small strata of quartz. On north upraise we have made 10 ft; ledge 4 ft solid, showing considerable cinnabar and sulphurets. In surface shaft to connect with upraise we have made 27 ft during the week. I have also started work again in north level.

PIOCHE DISTRICT.

DAY MINE.—*Record*, July 3: We visited this mine recently and found the dump and ore-house filled with high-grade ore, the assays averaging from \$116 to \$130 per ton. We should judge that there were about 200 tons of ore on the dump, and being piled up where a person can walk around and examine it, it naturally takes one's eye and looks very handsome. This ore is from the cave ore body. There has not been much change in the inside workings of the mine since last visit. The ore has always been found in pockets or chambers.

WILLOW CREEK DISTRICT.

ETHAN ALLEN.—*Paradise Reporter*, July 3: We learn from parties just over from Willow Creek that the incline on this mine is down a depth of 65 ft, and that the ledge at the foot shows a considerable amount of argentiferous galena and carbonate ore, assaying from \$45 to \$150 per ton in silver. A crosscut is now being run from the foot of the incline, and we hope in our next issue to be able to make a much more favorable report.

PAYSON.—This mine, from which we were shown some samples, is an extension of the famous Ohio mine, at Willow Creek. The samples shown us were very fine, and as the claim is being prospected by 2 shafts, we expect in a short time to chronicle another rich strike.

ARIZONA.

PATAGONIA DISTRICT.—*Tucson Citizen*, July 3: The Davis mine in this district is something more than a prospect. A prospect shaft was sunk to a depth of 35 ft, just above the cut which laid bare the immense body of ore on the surface. A drift was run east some 600 ft, which crosscuts the ore body full 40 ft in width. A cut was extended north 20 ft, most of the way in very rich ore. The south drift is in 60 ft, showing up very well. From this drift a winze was run down on the ledge in 35 ft of solid ore. This winze extends down 100 ft, where the 130 level has been run in some very fine ore, which assays \$100 in silver and runs fully 40% lead. The ore is remarkably free, and may be readily reduced.

MARK TWAIN.—This mine is near the Davis, and is prospecting fine. A crosscut was recently made in the prospect shaft, exposing a fine body of carbonate ore similar to that of Davis. These 2 mines belong to the Holland Co., of which Mr. J. K. Luttrell is the manager.

HARSHAW DISTRICT.—Work has been steadily prosecuted on the Julia, which lies about 1 1/2 miles from the town of Harshaw. A drift was run east about 25 ft, and discloses a 4-ft ledge of chloride ore. A pay streak 4 ft wide carries ore that it is believed will average \$30, as the rock is of a most uniform character, and assays as high as \$115 have been obtained.

NOTES.—The Delaware has a 30-ft tunnel all in ore, and the Brick Top, which joins the Delaware, has a 30-ft shaft in the vein, which carries ore all the way across. Assays from this fine ledge body run as high as \$175.

TOBACONIST DISTRICT.—*Nugget*, July 3: Work on the Bradshaw mining property is progressing, and the shaft, now between 90 and 100 ft in depth, is being heavily timbered from the bottom, preparatory to its becoming the working shaft. The large body of rich ore, some of the best in the district, which is seen from the top to the bottom of the shaft, is a sight well worth the trip to see.

VIRNA MINE. The developments in the working shaft of the Virna mine are of the most encouraging nature, the body of rich ore which has been reached, widening out and giving every evidence of being all in extent and permanency that the company could hope for.

NOTES.—A claim which has just had some work done on it by the owners, and which is now being worked by the Virna mine, has been developed some good ore at the bottom of a 20-ft shaft. The boisterous work on the Sulphuret mine steamed up this week for the first time, which now makes 7 in operation in the district and all near the town.

GLOBE DISTRICT.—*Cor. Silver Belt*, July 3: At the Mack Morris mine there are several hundred tons of ore on the dump, and the mine is constantly increasing from the winze, 30 ft deep, in the second level of the east shaft. The strike in the winze had been made the evening previous to our arrival, and consequently, all were jubilant, for the value of the ore was \$927, as was subsequently ascertained by assay.

NOTES.—G. W. Sharp has run 40-ft tunnel on the Cora mine, third extension west on the Mack Morris and Richmond, and has struck the main ledge, which shows a good prospect. The Victoria, adjoining the Richmond on the north, has a 12-ft shaft, which shows very rich ore. The Silver Nugget mill is now running on good ore. The Supt. assures us that he will turn out \$30,000 bullion within 30 days, or \$1,000 a day with 5 stamps.

PAYSON.—*Arizona Miner*, July 2: We are pleased to know that the Model mine, recently purchased by Gov. Powers, has commenced to send forth bullion. Six hundred dollars were brought in from the mine recently, which was secured by arastor process. When the Governor shall have erected his new stamp mill on the Model, bullion will go forth and the boom will have commenced.

COLORADO.

PARK COUNTY.—*Fairplay Flume*, July 3: Information reaches us of an excellent strike on the Chasapaign ledge, located near the headwaters of Mosquito creek. The miners who are at work driving the lower tunnel have recently been taking out very high grade mineral from a small vein that has been followed from the surface. The vein in the breast of the opening measures about a foot in width and assays from 650 to 2,500 ounces have been secured from specimens taken.

SURET MOUNTAIN.—The late strikes on this mountain are of such great importance as to attract hundreds of prospectors, and not a foot of ground remains vacant so far as is known. One venturesome prospector has pitched his tent on the very summit of the mountain and numbers of others are camped but a little lower down. On the Independence ledge an 8-inch streak of galena has been determined.

ALMA PLACER.—On these diggings 40 men are employed, a double shift being kept on continually, in order to make the best use of the water while it lasts. Three flumes are used in the hill diggings and the bed-rock flume is being pushed on up stream quite rapidly. The rate of wages paid is \$3.50 per day for a 12-hour shift.

CRABO MINE.—The vein in this mine is 14 ft thick, and a working test of 2 tons yielded about 325 per ton. Lately the assays run higher than usual, as three assays 60.73 and 120 ounces of silver, and from 60% to 73% of lead to the ton.

CLEAR CREEK COUNTRY.—*Colorado Miner*, July 3: The new strike in the Rip Van Winkle, which is situated near the summit of Snake River pass, toward Gray's Peak, is of great importance. At week 13 inches of solid ore were struck, and a number of assays were made which ran from 362 to 364 ounces. It has now widened out to 3 ft of quartz and mineral, and as depth is gained the quantity and quality of the ore increases.

ALBRO LODGE.—This is one of the most promising mines in this section. The owners are engaged in driving a tunnel to cut this shaft and thus drain it. In the bottom of this shaft they have a large body of high grade ore. The tunnel is now 300 ft. in, and there yet remains 125 to run. They have in connection with this ledge, a 12-stamp mill, and accordingly they treat their own ore.

SUMMIT COUNTY FREES.—*Cor. Georgetown Courier*, July 3: About 10 tons of ore are being shipped each week from the Shock mine to Denver. The ore vein of the mine is from 4 to 5 ft thick, and mills from 300 to 400 ounces in silver per ton, the ore being quartz carrying chloride of silver.

LAURENT.—This mine is the most famous in Breckenridge. From 15 to 30 tons of ore are shipped each week, which mills about 125 ounces in gold, 70 ounces in silver and from 40% to 60% in lead.

IDAHO.

BANNER DISTRICT.—*Herald*, July 2: Forty men are now employed by the Elmira Co., and on starting the mill the force will be considerably increased. The vein of black sulphuret ore, rich in silver and discovered near the Crown Point a week or two ago, has widened from 6 inches to 2 ft, and is as rich as ever.

SALMON RIVER DISTRICT.—*Yankee Fork Herald*, July 3: The Yankee Fork Gravel M. Co.'s ditch is progressing favorably, three-fourths of a mile being already completed. The ditch is 9 ft. in width at the top, 5 ft. on the bottom and 4 ft. deep. There are 57 men at work. The ditch was commenced the 17th of June, and they will be ready to start up the hydraulics by August 1st.

QUARTZBURG ITEMS.—A force of men is at work on the Iowa mine, and a tunnel is running to cut the vein at a depth of 250 ft. This mine has yielded some exceedingly rich ore, and it will be made to pay well as soon as everything is in proper shape.

GIBBONVILLE DISTRICT.—*Cor. Butte Miner*, June 30: Gibbonville is in Idaho, a short distance across the divide from the head of the Bitter Root, and on the direct route from Missoula to the Yankee Fork mines. This is both a quartz and a placer camp. To work the former we have a 4-stamp mill and 14 roasters, and are already commencing to work the latter. The mine is rich in silver, and assays from \$30 to \$100 per ton. Altogether about 30 lodes that will pay have already been opened.

MONTANA.

DEER LODGE COUNTY.—*Butte City Miner*, July 0: The Burnett mine continues to yield about 35 tons of free ore per diem without making any apparent impression on the reserves in sight. It is situated in a very favorable position on the slopes in the east level, where there is such a mammoth body exposed that it is considered unnecessary to explore the mine in other places. The Dexter mill has been running 4 months almost exclusively on Burnett ore, and for some time the stamps of the Centennial mill have been kept busy from the same property.

HIGH ONE.—This immense ledge continues to yield as much ore as the milling facilities of the company will allow them to crush. The slopes in the east level are looking well and seem to be inexhaustible.

NOTES.—The first, or 40 level running west, connected some time ago with the Tom Hane shaft, 200 ft. distant, and is now about 70 ft. on the other side. Stopping is actively progressing in several places and a considerable amount of base manganese ore is being daily hoisted to the surface.

PHILIPSBURG DISTRICT.—A very important strike and one which caused considerable excitement in Philipsburg, occurred several days ago in the Salmon mine, one of the Algonquin Co.'s properties. On one of the lower levels a large body of exceptionally rich ore carrying a profusion of native silver was discovered.

MINES OF THE ALTA MONTANA CO. are looking and producing very well. The large water-jacket furnace is running in good shape and producing bullion which is now averaging 300 ounces of silver per ton, and about \$70 gold. The new 35 ton smelter has not yet arrived. When it comes it will immediately be put in place, and then the capacity of the works will be more than doubled.

NEW MEXICO.

LAKE VALLEY DISTRICT.—*Grant County Herald*, July 3: Two tons of ore from this district was lately taken to the mill of the Mimbres company, where it was pulverized, spread out and sampled by quartering and re-weighing, when an assay was made which showed the fine result of 692 ounces to the ton. There are thousands of tons of ore lying on the surface that will run from 30 to 70 ounces in silver.

NEW DISCOVERY.—A new mineral discovery has been made about 4 miles northwest of Nicol's ranch, on the Upper Mimbres. Croppings assay from 30 to 60 ounces.

The discoverer named his first location Victoria. **GRANT AND VICTORIA DISTRICTS.**—*Chronicle*, July 1: These districts lie in the southeastern part of Grant county, and a large number of locations have already been made. We were to-day shown some specimens of ore from the claims of J. G. Crittenden and J. M. Casey, in Stone-wall district, that are pretty near the solid stuff. Mr. Crittenden has assays made from this ore that run as high as 300 ounces to the ton. Work on these mines, suspended on account of Indian troubles, will be resumed in a few days.

Origin and Classification of Ore Deposits.

In the *School of Mines Quarterly*, for March, 1880, Prof. J. S. Newberry has a valuable paper on the "Origin and Classification of Ore Deposits." The Professor groups the occurrence of metals in three classes, namely: 1st, superficial deposits; 2d, stratified deposits; 3d, unstratified deposits. The latter class embraces, with even other divisions, the occurrence of deposits in limestone, his account of which we give in full:

Chambers or Pockets in Limestone.

These chambers form the receptacles of ore in many countries; but nowhere else are such striking examples of this class of deposit as those found in our Western mining districts. From a study of these, I have been led to add them to the catalogue of forms of ore-deposit as a distinct and important addition to those given by other writers. The distinctive characters of these accumulations of ore in chambers and galleries has not been heretofore generally recognized, and a want of information in regard to their true nature has led to much litigation and heavy losses in mining. The best examples of chamber mines are the Eureka Con., Richmond, etc., of Eureka, Nevada; the Emma, Flagstaff, Kessler, etc., in Little Cottonwood district; and the Cave mine, near Frisco, Utah. All these mines are alike in this, that the ore is found more or less completely filling irregular chambers in limestone. Some of these ore bodies are of great size, and the aggregate product of these chamber mines is so great as to make it necessary to record this as one of the most important forms of metalliferous deposit. From the Potts chamber in the Eureka Con. mine, it is said that ore of the value of a million dollars was taken, while a still larger amount was produced from the great chamber of the Emma. The origin of these chamber deposits is, in my judgment, simply this: A stratum of limestone, more than usually soluble in atmospheric water, carrying carbonic acid—which dissolves all limestones—has at some time been honeycombed by chambers and galleries such as those which traverse the limestone plateau of Central Kentucky, of which the Mammoth cave is an example. Subsequently this rock has been broken through and upheaved by the subterranean forces which have disturbed all our important mining districts; and through the fissures then formed mineral solutions ascended, flowing into any receptacle opened to them. Where these fissures cut an insoluble rock, they became, when filled, simply fissure veins; but where a cavernous limestone was broken into, such caverns and galleries as were opened were more or less filled with ore. It has been suggested that the caves now holding ore were excavated by the metalliferous solution; but we find some of them entirely empty, with their sides incrustated with spar, and having all the characters of ordinary limestone caves, and even where the ore occurs, the walls of the cavity have the same character, are hard and unimpregnated with ore. Hence we must conclude that the chambers were formed, like modern caves, by surface water; and when the country was upheaved and the rock shattered, only part of them were opened, and that these received the solution and ore, while the unopened ones remained empty. The character of the ore contained in the chambers varies much, as it does in the fissure veins of our mining districts; and the solutions from which they were filled must have been different in the different localities where they occur. Argentiferous galena was evidently the most abundant ore deposited in the chambers, as it is elsewhere; but in some cases, this is associated with a large amount of iron sulphide, in others very little; while the ratio of gold to silver is inconstant, and the aggregate of both varies from nothing to several hundred dollars to the ton. The ores of Eureka run high in lead, contain much iron, and about \$70 in the precious metals, half gold, half silver. The ores of the Emma mine carried less iron, more lead, much more silver, less gold, and a little copper; while those of the Cave mine, at Frisco, contain no lead, much iron, a little copper, and are sometimes exceedingly rich in both silver and gold. In all the chamber mines yet worked in this country, the ore taken out is thoroughly oxidized; but in the deeper workings of some neighboring fissure veins, the soft, ochery ores of the chambers are found changed below into compact masses of galena and iron pyrites; the galena carrying the silver—the pyrites, the gold. Hence we may conclude that the ore originally deposited in the caves consisted of sulphides, and that, whenever these mines shall be worked below the water-level, ore of this character will be found. It should be said, however, that if the theory I have suggested of the formation of the limestone galleries and chambers is true, they will not be found to extend to so great a depth as the ore bodies of fissure veins, since the excavation of the limestone, if produced by atmospheric water, must be confined to the zone traversed by surface drainage. In a very dry and broken country, the line of permanent water-level may be very deep, as at Eureka, where the ore bodies extend and are oxidized to a depth of at least 1,400 ft. Such a condition of things could only exist in a very dry climate; but we have evidence that there have been great climatic changes in our western mining districts; according to King and Gilbert, two wet periods having been succeeded by two dry ones, the last prevailing now. We may therefore find chambers wrought in the limestone in a dry period below the present or normal water-level. The enormous production of gold and silver from the

chamber mines already worked proves the great importance and value of this class of deposits; and while we may predict that they will be found to be more superficial than true fissure veins, no limit can be fixed to the future yield of mines of this character, even though they should not be profitably worked below 1,500 ft. from the surface.

The General Interest in Mining.

One of the surest evidences of the increasing interest in mining enterprises is found in the space which is being given to articles treating of mining in periodicals, some of which are not usually open to the discussion of technical subjects. This increased interest was first seen in the daily newspapers, many of whom took the matter up in earnest and created departments of mining, managed with greater or less ability according to the skill of the editors and the needs of the paper. Of course, in case of the dailies, it is in most instances purely a business transaction, in which the diffusion of authentic news is of less importance than the acquirement of perquisites from the company to whom the mining department is shown to be a desirable medium for advertisement.

The same, however, cannot be said of the monthlies and quarterlies, which occupy an entirely different field from the newspapers, and which are far more conservative and independent in their opinions. Even here, however, the "boom" has made itself felt, and the literary conservatism of the former has in several cases fairly broken down under the stress of popular interest, and they have opened their columns to thorough-going and discriminative discussions upon the mineral resources of the country, and upon the methods and results of mining both in general and in particular. Two notable examples of this sort are found in the January number of the *British Quarterly* and in the April number of the *National Quarterly*. Last of all, the staid and conservative *Atlantic Monthly* joins the ranks with a well-written article in the June number upon the future of mining upon the American continent, by Prof. N. S. Shaler. Prof. Shaler's extensive knowledge as a practical geologist enables him to generalize in the matter with a good show of reason, and to draw some useful deductions as to the conditions under which deposits of gold and silver take place. With some of Prof. Shaler's theories we may not be able to agree entirely, but we find ourselves in full accord with him in his optimistic confidence in the vast increase of the mineral production of this country in the future, and we think that the arguments by which he supports his predictions are eminently sound and just. There never has been any question in our minds as to the advantages which will accrue to this country from the development of her mines of precious metals. In this her future is assured, and the pre-eminence she has acquired in the past, and now retains, will be as a drop compared to her coming prosperity, providing the natural evolution of our industries is not interfered with by injudicious and harmful legislation.—*The Economist*.

Silver in Europe.

When Germany became inflated with money and pride after the successful issue of the French war, and the enormous indemnity that flowed into her treasury vaults, she thought she was about to direct the course of the world in commerce and finance as well as in diplomacy. The diplomacy is a riddle yet unsolved; in finance she is receding from her hasty demonization of silver, and is anxious to resume bimetalism. France and the countries of the Latin union use both metals, and the balance in the Bank of France is enormous—\$163,000,000 in gold and over \$245,000,000 in silver. England is the representative of monometalism, which she is able to maintain by her peculiar monetary system and by the unflinching confidence which the people and the government have in the Bank of England's ability to meet every crisis. But this faith has been put to a severe strain upon various occasions and it may be over-stretched yet. The difficulty of a bimetallic system seems to be in the exact adjustment of the fluctuating relations of the two metals and maintaining their reciprocal par values. The tastes and habits of a people have something to do in matters of finance. The Germans miss the silver for which they have no substitute, and they have not gold enough for active business uses. In our own case we have not reached the point of inconvenience from the inequality of the two metals. The volume of greenbacks has been fixed by law, and there is no danger of paper inflation in the present temper of the public mind. If, however, the smaller notes were called in, this would have the effect of releasing silver for ordinary use, and so depleting Treasury accumulations. Some writers profess to anticipate trouble from the excess of silver in the hands of the government through the well-known law that the inferior currency drives away the superior. The theory is indisputable, but we are as yet in no danger of its immediate application. In the first place, the silver is in vault and not in circulation, the bankers declining to receive it on deposit; and for the purpose of legal tender its place is more than supplied by the greenback, which so long as it is convertible is a great convenience; meanwhile the government has a growing balance of cash in hand, for which uses will arise before the amount becomes oppressive.—*The Economist*.

The Yellow Jacket Pumps.

The stupendous pumping machinery of the Yellow Jacket mine is now regularly at work whenever there is a sufficient accumulation of water. This machinery is regarded as a remarkable triumph of mechanical skill, and we spare space for the following description of it from the *Territorial Enterprise*:

The Pumps.

There are, in all, in the shaft 13 pumps, the lowest one being at the 3000 level and the upper one well up toward the surface. To support the weight of the rod there are eight balance hobs, which hobs carry a total weight of about 240 tons of ballast. As these hobs have considerable leverage the weight of the pump rod, and all its belongings, may be set down as being, in round numbers, 300 tons.

The pumps are on an average something over 200 ft. apart and at each is a large water tank. By the motion of the rod the water is pumped from tank to tank until moved from the bottom to the top of the shaft. When the huge iron plunger of a pump descends into its harrel or cylinder it forces up the column a quantity of water (80 gallons), which is poured out into the tank of the next pump above, and as it ascends it draws into its harrel 80 gallons of water from the tank at which it stands. Thus the work goes on at all the pumps and tanks throughout the shaft.

The Pump Rod

Passes through stays that are placed across the compartment every 30 ft., thus preventing all vibration. These stays are merely sticks of timber placed on all four sides of the rod, thus forming a square hole through which it plays up and down. On the rod at these points are placed chafing boards. In some places these are hickory wood, while in others they are some softer wood faced with angle iron. On the stays are placed little cups containing grease, so arranged as to slowly flow out and keep the chafing boards properly lubricated.

Rod-Catchers

Are an attachment to prevent the rod falling down the shaft in case of it breaking at any point. There are in all six of these rod-catchers. They are merely huge blocks of wood securely bolted and banded to the rod. In case of the rod breaking it can only fall a very short distance, as these large blocks prevent its passing down through the stays. These great blocks and the heavy elbs of iron bolted along down the sides of the rod give it vast weight and a most ponderous appearance—the rod itself being formed of a stick of timber sixteen inches square.

The Balance Bobs.

To simplify the description, it may be said a balance hob is a long beam of wood or iron resting near the center on a fulcrum. On the outer end of this beam is a large wooden box capable of holding many tons of iron ballast, while at the inner end is a huge iron clevis, by means of which the bob is attached to the rod. This clevis is not fastened to the rod immediately at the end or nose of the bob, but reaches down and connects with the bob 10 or 12 ft. below. This method of fastening is necessary on account of the swinging or rocking motion of the bob, which describes part of the circumference of a circle, while the rod moves straight up and down. By adding to the main beam, above described, braces that start from near the ballast box at one end and near the nose of the bob at the other, running up until they meet in the shape of the letter A, you have a balance bob just about as it is seen in a mine.

The Pump Column

Is the large iron pipe through which the water is forced up out of the mine. At the Yellow Jacket this pipe or column is 14 inches in diameter. It is of wrought iron and very heavy. In order to support the column in the shaft there are large collars upon it at regular distances, which collars are supported upon the heavy timbers about the pumps and at other proper and convenient points. By this means the great weight of over 3,000 ft. of column is little felt at any one place.

Extra Pumps.

There are six pumps above the point where the south branch of the Suto tunnel will tap the shaft. When connection is made with the tunnel these may all be taken out and used at points below if necessary. The disconnection of so many pumps will greatly lighten the work of the engine and much relieve the strain on all parts of the machinery.

A Wonderful Feat.

The simultaneous starting up of a line of pumps 360 ft. over half a mile in length is truly a most remarkable achievement and a feat that has never before been performed or attempted in any part of the world. When the big engine made its first revolution all this half mile of pumps made a stroke. Not only was the whole pump rod of 300 tons moved but a great weight of water was also lifted. Had not every part of the rod, stays, hobs and pumps been in position almost to the breadth of a hair this could not have been done. Great credit is due Mr. Pyne, who placed in position all the 13 pumps, 8 hobs and the many other parts, for the patience, skill and excellent judgment displayed. A very little thing out of place at any one point would have caused a grand smash-up of everything.

Traction Engines on Hawaiian Sugar Plantations.

Mr. Williams, manager of the Kohala plantation, writes the following account of experiences with three English traction engines; one of 10-horse power and two of 8-horse power each. He says:

To-day is the fourth week that I have not had a bullock team hauling cane. Two engines with four cars to each engine (2 small and 2 large) were hauling from one field $1\frac{1}{2}$ miles away, 6 trips a day; and one field near by, 9 trips a day, all ratoon cane, and are taking 23 clarifiers a day (with cattle we could only get cane enough for 21 a day). To get in this amount of cane would take 15 of our cane wagons, with five yoke of cattle to each team. We go right into the field close to the cane, just as we do with cattle, and can dump the cane closer to the cane carrier than we can with cattle.

Have been keeping account of coal used on each engine for three weeks full work every day, and find we have used about 51 or 52 tubs a week on each engine. A tub weighs on an average 80 lbs. of coal, so 4,160 lbs., say to estimate 2 tons to each engine per week. I get in this amount of cane with 10 less men than if I had teams on. We have a driver (white man) and a native helper on each engine, and one native to walk alongside of the load and pick up cane that falls off, and help connect and disconnect in field and in mill.

Each engine has four wagons, two are loading in the field while the other two are being hauled in. There is no waiting in the morning till you get the cattle in and yoked up; the native helper gets his 20 cents overtime in the morning for getting up team before the whistle blows to go to work.

Directly the mill starts, the engine starts out to the field; the wagons are left loaded in field over night. She takes out her two empty wagons and brings in the full ones, dump them, and if it is breakfast time, they go to eat. They leave the engine standing alongside the road, it is all right, no team will blow off. We fetch in every trip equal to 4 of our large bullock wagons, (but this is with one large and one small wagon); with all English wagons we fetch in equal to 5 of our large bullock wagons at a trip. The other week we had two English wagons left loaded in the field at night; it rained heavily for the next two or three days, and being afraid the cane might sour, sent out some teams to unload them and fetch in the cane; it was as much as they could do to get the two onto five of our bullock wagons. As they did not know at the time they loaded the engine wagons, we call it a fair test. This is on ratoon cane, if on plant cane we can load more, as the ratooners are shorter than plant, so cannot keep as much cane on a load. Some two years ago, to give Mr. Watson exact figures, I weighed 10 wagons of ratoon and it made 52,350 lbs. cane; so I calculate that with all large wagons we haul in at each trip 10½ tons of ratooners, and 11 tons weight of plant cane.

On one road where we are hauling, we come up a hill with a rise of 1 ft. to 11 ft. 3 inches; coming up a hill they put on slow speed at about $2\frac{1}{2}$ or 3 miles an hour; on level ground they put on their fast speed at $\frac{5}{8}$ or 6 miles per hour. The changing speed is done in half a minute, stop and change a pin in or out.

At mill the engine itself pulls off the load. We lay three ropes in bottom of wagon, made fast on side to bolts inside before loading. These ropes are about 50 ft. long each. When they get to mill we let down one side of wagon, throw the three ropes over the load and make them fast; we have a snatch block and tackle made fast to cane carrier, hook the tackle onto the ropes, lead the end of tackle to engine; it unhook from the wagons and walks off with the fall, pulling off all the cane. Before we got hold of this method, we used to have to stop the mill and put on 30 hands to pull on the ropes to pull the load off.

As far as I can estimate at present, charging \$5 per day for driver, the cost of native helpers, loaders in the fields, coal, oil, etc., 10% on cost of engines, and allowing for wear and tear, what costs us at the rate of \$90 per day with cattle, we haul in with traction engines for \$60 a day. In the \$90 for cattle, the rent of pasture lands and miles of fencing and keeping is not included, which is a large item, when a great deal of your pasturage will do for cane. You cannot work the engines in wet, showery weather, and they will have to be worked up into a system. They more than come up to my expectations. In fine weather, when it is hot and dry, and your cattle play out, is the time for the engines and the time to push your grinding.

CENSUS OF NEW YORK CITY.—The census returns for this city are now so well in hand that the total can be given with considerable precision. The population of the metropolis is 1,207,215. This marks a gain of 254,923 in 10 years, and of 1,004,626 since 1830. In a quarter of a century the population of the city has doubled. At the same time all the metropolitan suburbs have increased and multiplied until New York as a center of population ranks next to London. Brooklyn, with a population of over 560,000, retains its place as the third city in the Union, although it can scarcely expect to keep it in view of the astonishing growth of the great cities of the West. Whenever the supremacy of New York as the metropolis of the country is seriously menaced, the annexation of Brooklyn will give it breathing space for at least one generation.

Mineral Resources of Southern Russia.

An important concession has been made to an American capitalist, Mr. Wharton Barker, by the Russian government, to undertake, under very favorable conditions, the development of the mineral resources of southern Russia, with particular reference to the coal and iron fields bordering upon the Sea of Azof, which are believed to be immense. A commission of geological experts has visited the region and made a very favorable report of the magnitude and possible value of the mineral riches of the country; and, on the strength of this report, a body of railway and manufacturing experts, in the interest of leading American capitalists, has set out for the purpose of estimating the commercial value of the proposed enterprise.

The project that is being set on foot will, if undertaken, prove to be the greatest enterprise ever entered into between American capitalists and a foreign power. Should this preliminary investigations now making be quite satisfactory, the work will be undertaken at once. It is understood that the concession granted by the Russian authorities includes the exclusive right of opening up the Donetz coal-fields, north of the Sea of Azof; the iron deposits of Krevoi Rog, north of the Crimea; the construction of a railway system in connection with these developments; the establishment of a great shipping port on that sea; the erection of Bessemer steel works, grain elevators, etc. To realize this ambitious project, it has been given out that \$5,000,000 will be required, and this amount is said to have already been pledged by New York and Philadelphia capitalists, contingent upon this satisfactory outcome of the preliminary investigations now in progress.

LUMINOUS PAINT NOT NEW.—Much is being said, just at this time, in regard to the utility and novelty of a luminous paint recently invented by Mr. Balmain. But now comes *Nature*, of June 10th, and informs us that the Japanese were acquainted with the art of luminous painting 900 years ago. That publication gives a translation from a Chinese book, written about that time, from which it appears that one Su Ngoh had a Japanese picture of an ox, which, it was said, left the frame every day to graze, and returned every night to sleep within it. This picture finally came into the possession of one of the Chinese emperors, who showed it to his courtiers, and asked for an explanation, which none of them could give. At last a Buddhist priest informed the emperor that the Japanese found a substance in a certain kind of oyster, out of which they manufactured a paint which was invisible by day, but luminous by night. The explanation was given by the writer of the book, that when it was said the ox left the picture by day to go a-grazing, it was simply understood that during the day-time the figure was invisible.

CHINESE SHIP-BUILDERS.—It has been something of a mystery to Americans in the light of the remarkable depression of the carrying trade in the recent years, that British ship-builders should continue to turn out so many iron steamships. A convention of American ship owners has been proposed, to be held next October, with the view of agreeing, if possible, upon what legislation is required to place our merchant marines upon a basis that will enable it to compete successfully for ocean commerce. But the seeming mystery is largely explained by the fact that a firm of Scotch ship-builders are said to have established themselves at Shanghai, and are turning out iron steamers of the largest size. All of their 1,100 workmen are Chinese, who labor for a few cents each per day. Notwithstanding nearly all the raw material used in those yards has to cross oceans, nowhere in the world can a ship be built more cheaply. The *London Times* sees in this fact something seriously ominous to the shipwrights on the Clyde and the Tyne.

THE LARGEST HAILSTONES.—It has hitherto been supposed that the report of the *Bombay Gazette*, quoted in *London Nature*, of a hail-storm occurring last March at Dharwar, during which hailstones fell that measured 9 or 10 inches in circumference, was the most remarkable case on record. It has since appeared, however, on the authority of the *Iowa Weather Service Bulletin*, that during the month of April, 1880, thunder-storms occurred in that State, during which hailstones fell measuring 12 inches in circumference.

A NEW SKATING SURFACE.—A skating surface, called by its inventor, "crystal ice," has been laid down in a London skating rink. It consists of a mixture of the carbonate and sulphate of soda. The crystallization of these salts produces a floor which so closely resembles ice, both in appearance and the resistance of its surface, that when it is a little "cut up" the deception is said to be quite astonishing. It can be skated on with ordinary ice skates. When roughened too much it is smoothed away by steaming with an apparatus provided for the purpose.

AN AMERICAN SCIENTIST HONORED.—At Berlin recently the prizes to exhibitors at the International Fishery exhibition were distributed. The first honorary prize was awarded to Prof. Baird, of the Smithsonian Institute, United States. He will receive a gold medal and an address. At the distribution of the prizes Prof. Baird, of the Smithsonian Institute, spoke, eulogizing Emperor William, who, he said, was to be found in every place where there is an opportunity for promoting goodness and truth.

USEFUL INFORMATION.

How to Use Glue.

The following practical hints on the preparation and use of glue are from the *London Furniture Gazette*:

All the glue as received from the factory requires the addition of water before it will melt properly, and every addition of water (while the glue is fresh made) will, up to a certain point, increase the adhesiveness and elasticity; and it is the duty of every man who uses glue to find out just where that point lies, as it is possible to melt glue and have it so thick that after it is dry or set it will be so brittle as not to adhere to the wood. Some glues will bear more water than others, but all will bear more water than usually falls to their share, and that, too, with a greater increase in the quality of the work.

For glue to be properly effective, it requires to penetrate the pores of the wood, and thus more a body of glue penetrates the wood the more substantial the joint will remain. Glues that take the longest to dry are to be preferred to those that dry quick, the slow-drying glues being always the strongest, other things being equal.

For general use, no method gives so good results as the following: Break the glue up small, put into an iron kettle, cover the glue with water and allow it to soak 12 hours; after soaking, boil until done. Then pour it into an air-tight box; leave the cover off until cold, then cover up tight. As glue is required, cut out a portion and melt in this usual way. Expose no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue.

Never heat made glue in a pot that is subjected to the direct heat of the fire or a lamp. All such methods of heating glue cannot be condemned in terms too severe.

Do not use thick glue for joints or veneering. In all cases work it well into the wood in a similar manner to what painters do with paint. Glue both surfaces of your work, excepting in the case of veneering. Never glue upon hot wood, or use hot cane to veneer with, as the hot wood will absorb all the water in the glue too suddenly, and leave only a very little residue, with no adhesive power in it.

A "Filler" or Polish for Wood.

(1.) Four parts of white wax are added to 3 parts of oil of turpentine, and the whole is heated in a flask or bottle, immersed in hot water, until the wax is liquefied and almost dissolved. It is then allowed to cool, and when it begins to turn white and to harden 2 parts of strong alcohol are added, under stirring. This mixture is applied by means of a woolen cloth and thorough friction. The alcohol may be increased to 4 parts, but the friction must then be continued for a longer time.

(2.) One pint of linseed oil, together with 2½ oz. of alkanet root, are heated to boiling in a clean pot over a slow fire, and kept at a gentle boil for about two hours. When cool, the mixture is applied in a thin layer to the wood, and after the lapse of 24 hours well rubbed in.

(3.) The best polish, particularly for fine wood, is milk! After all dust and dirt have been carefully removed, good fresh milk is applied to the wood and well rubbed in with a woolen rag, until all moisture has disappeared. This must be repeated several times, and in the case of new utensils should be done once a week. Milk has this advantage that its fatty substance answers the same purpose as linseed oil, and its other constituents act as a filler while it leaves no disagreeable flavor. For some light-colored woods sublimed sulphur with hoiled oil makes very good filling.

One ingredient, however, is necessary in all of the above processes, without which success will not be attained, and that ingredient is *adeps cubitalis*, vulgo "elbow-grease."

THE ABSORBING POWER OF EARTH.—Without obtaining a practical test one can hardly appreciate the absorbing power of dry earth, or the leaching effect of some kinds of soils. A writer says: "We once deepened a manure pit that had a blue clay bottom. This pit had been used for years, there was never less than a foot of water in it. After emptying we commenced to deepen it, expecting to find a rich black earth for a foot or two, but to our astonishment, the clay two inches below the bottom was not soiled, but looked as pure and blue as it did two feet deeper. But all kinds of soils are not as impenetrable to liquids as blue clay. By actual experience we have found that dust an inch thick over a dead animal will prevent the escape of bad smells. In hen-houses the effect is magical, preventing not only bad odors, but vermin as well. Even for old running sores and ulcerated wounds when chemical disinfectants could not be had, dry earth or dust has proved highly beneficial. The fact seems to be that neither the liquids nor gases of decaying matter can pass through two inches of earth without losing the greater part of what constitutes its peculiar characteristics, that is, its offensive or valuable portion, as the case may be. Properly used in the stables, cesspools, sink-drains, etc., dry earth will save a vast amount of valuable fertilizing matter, and prevent expensive and life-destroying disease."

A NEW SKATING SURFACE.—An English inventor, after much study and experiment, has, quite recently, devised an entirely new skating surface, which he calls "crystal ice," and which consists of a mixture of various salts, mostly, however, sulphate of soda, which crystallize at ordinary temperatures. This preparation, which is comparatively cheap, is simply spread out, in a plastic condition, from an excess of water, upon an ordinary floor. As soon as the excess of water evaporates the substance becomes crystallized, presenting a surface much resembling ice, quite as hard, and upon which ordinary ice-skates may be used with about equal facility as upon a water-frozen surface. When "cut up" by skaters, its surface can be readily smoothed by a steaming apparatus, and the floor, when once laid, will last for years. It is obvious that such a floor must have many advantages over artificial ice and floors for roller-skating. It is said that the mixture of salts used contains about 60% of water of crystallization; hence, after all, this floor consists mostly of solidified water. The above facts are obtained from *Nature*, of June 5th, in which it is further stated that a small experimental floor has proved such a complete success that a large skating rink is to be immediately constructed upon this principle.

WORCESTERSHIRE SAUCE.—The *Canadian Pharmaceutical Journal* says that the following recipe gives a sauce closely resembling "Worcestershire." Vinegar, 1 qt.; allspice, powdered, 2 drams; cloves, powdered, 1 dram; black pepper, powdered, 1 dram; mustard, powdered, 2 oz.; ginger, powdered, 1 dram; salt, 2 oz.; shallots, 2 oz.; sugar, 8 oz.; tamarinds, 4 oz.; sherry, 1 pt.; curry powder, 1 oz.; cayenne, 1 dram. Mix all the ingredients together, simmer them for an hour, and strain. A little brandy coloring may be added to darken the sauce.

TO CLARIFY LIQUIDS.—The following composition is said to bleach all colored liquids, and to render bone-black unnecessary: Albumen, 300 parts; neutral tartrate of potash, 2 parts; alum, 5 parts; acid ammoniac, 700. The albumen must of course not be coagulated. The ingredients are first dissolved in a little water, and then added to the liquid to be clarified.

A SURE AND SAFE RAT POISON.—The following mixture is sure death to the rats, and not poisonous to other animals, in the ordinary sense of the word: Take of old cheese 10 parts; glycerine, 2 parts; carbonate of haryta, 5 parts; rye or corn flour, 1 part, and form into pills or boluses of convenient size.

GOOD HEALTH.

Keep Your Mouth Shut.

The peculiar arrangement of the narrowed and branched and delicately-furnished nasal passage are specially suited to strain the air and to warm it before it enters the lungs. The foul air and sickening effluvia which one meets in a day's travel through the crowded city are breathed with greater impunity through the nose than through the mouth. Raw air, inhaled through the mouth, induces hoarseness, coughs, etc.

The great actor Cooke, when dying, told his friend and faithful attendant, Broster, that, although he could make him no bequest in money, he would give him something worth money. He then advised Broster to set up as a teacher of elocution, and to impart to his pupils, on condition of a large fee, and a solemn promise not to divulge it, the secret of his (Cooke's) extraordinary powers of voice and its unflagging quality, which was to carry on respiration through the nostrils, so as not to dry or irritate the delicate organs of the voice. Broster took this advice, and used it so well as to retire with a fortune. He made every young clergyman, who took lessons, sign a bond that in the event of his becoming a bishop he would pay a further fee of 100 guineas. John Thelwell inherited the secret from Broster, and used it with similar reserve and profit; but his son, on being appointed a college lecturer on public reading and speaking, disclosed the secret to all his pupils as a thing of the greatest importance to them.

Mr. Pitman gives an epitome of the experience of George Catlin in his travels among the Indians, of whom he visited 150 tribes. Everywhere he found the Indian women careful to press together the lips of their children after leaving the breast and before being suspended in their narrow cradles in the open air, and he found it to be a very rare thing to hear of a death during childhood among any of the tribes, before strong drinks and new diseases were introduced among them by the whites. It is said that no animal but man sleeps with his mouth open, and that the lungs need a degree of rest from labor which they get with the moderate inhalation that, with a slow puls, attends perfect nightly repose.

Mr. Catlin attributes his escape from malarial fevers, and his actual recovery from pulmonary weakness, to a strict observance of the rule to keep the lips and teeth tightly shut. When he went to the wilderness he was feeble. He found himself compelled to sleep in the open, dewy air. His one main precaution secured the entire restoration of his health and vigor. He found that all the Indians had good teeth, which

remained sound to old age, and that there were no stutters among them.

In his closing paragraphs he advises that mothers at home, and teachers in seminaries, should make nightly rounds as long as necessary to put a stop to the unnatural, dangerous and disgusting habit of sleeping with the mouth open. "No one who has been snoring through the night feels properly refreshed in the morning. Keep your mouth shut, my young readers—when you read silently, when you write, when you listen, when you are in pain, when you are walking or riding and by all means when you are angry."

MEDICAL USES OF EGGS.—For burus or scalds nothing is more soothing than the white of an egg, which may be poured over the wound. It is softer, as a varnish for a burn, than collodion, and, being always at hand, can be applied immediately. It is also more cooling than the "sweet oil and cotton," which was formerly supposed to be the surest application to allay the smarting pain. It is the contact with the air which gives the extreme discomfort experienced from ordinary accidents of this kind, and anything which excludes air and prevents inflammation is the thing to be at once applied. The egg is also considered one of the best remedies for dysentery. Beaten up slightly, with or without sugar, and swallowed at a gulp, it tends, by its emollient qualities, to lessen the inflammation of the stomach and intestines, and, by forming a transient coating on those organs, to enable nature to resume her healthful sway over the deceased body. Two, or at most three, eggs per day would be all that is required in ordinary cases; and, since the egg is not merely a medicine, but food as well, the lighter the diet otherwise, and the quieter the patient is kept, the more certain and rapid is the recovery.

The hair is much abused in its relations to healthfulness and growth. Pulled, twisted, torn, burned into a friz, and besmeared by all sorts of unguents and lotions, it is a wonder that baldness is not really the rule instead of the exception among those who most prize its beauty—the female sex. And it is equally neglected, if not abused, by most physicians, many of whom, while heartily condemning the thousand and one preparations well known to be not only injurious to the hair, but dangerous to the general health, show their total neglect on this part of their cure by relinquishing it to barbers and quacks. The treatise before us admirably fills a long-tolerated gap in the literature of the subject, which should not only be welcome to all physicians for whom it is a scientific treatise, while for the general reader it is also an entertaining work on the manners and customs of dressing the hair by all nations in all ages.

OAT MEAL FOR BREAKFAST.—In the last five years the consumption of oat meal in this country has probably increased 20-fold. People differ so much in their likes and dislikes that we do not insist upon anybody eating oat meal because somebody else does, but the great growth of the popularity is beyond doubt. Generally the Irish and Scotch meal have been considered best, but they sell comparatively high, and persons well acquainted with the subject say that Akron meal of Ohio is just as good. Oat meal should be well cooked. As it is usually made a breakfast dish, it may be soaked over night, and then boiled like mush for, say, half an hour, while the other part of the breakfast is getting ready. No doubt it is more wholesome eaten plain, but the temptation to use various "dressings"—generally cream and sugar—is too strong for any except very firm health-seekers. But where these are eaten it should be, as the friends say, "in moderation."

CONDITIONS INJURIOUS TO SIGHT IN SCHOOL CHILDREN.—Prof. Raux mentions the following: Air vitiated by animal emanations, vegetable or mineral dust, the smoke of various combustibles, especially tobacco, in which nicotine exists. Temperature too high or too low, and sudden changes or drafts. Clothing too tight, particularly at the neck or waist. Position with the head and body too much bent forward during labor with the eyes. Premature study, excess of reading, etc. Alcoholic excesses. Use of the eyes and brain immediately after eating. Habitual constipation, cold feet, and everything which tends to produce congestion of the head. Immorality, especially during childhood and youth. We might assign a cause still more potent than any of the foregoing, viz: a deficiency of light.—*Detroit Lancet*.

RAPID CURE FOR COLDS.—An Italian medical paper contains a letter from Dr. R. Rudolf, recording the discovery of a rapid cure for colds. Being seized with a severe coryza, he happened to chew one or two twigs of the eucalyptus, at the same time swallowing the saliva secreted, which had a bitter and aromatic flavor. To his surprise he found that in the course of half an hour the nasal catarrh had disappeared. Some days later he was seized with another attack, from a fresh exposure to cold, when the same treatment was successful.

WHEATMEAL OR OATMEAL.—Both these cereals are sufficient food for man. Oatmeal, however, contains more carbon, starch, or heat-producing material. Cornmeal contains a much larger proportion salt, while its albuminous constituents are greatly inferior to those of oatmeal; and wheatmeal, in its turn, is inferior to oatmeal in the same important constituents.



W. B. EWER,..... SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, July 17, 1880.

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The Week.

We are now in the full enjoyment of summer weather, which is agreeably cool and invigorating. In the interior the temperature is higher and more uniform, but it is pleasant and bracing, and both the farmer and the miner carry on their work with their accustomed vigor. This peculiar climate of our California, with its occasional blows and sudden changes, its quickly passing wavelets of heat and cold, is a priceless gift which we scarcely appreciate. Could the cool winds which blow over our city, and fill one's eyes with rubbish, pass for a day through the suffocating streets of blazing New York, they would be pronounced blessed by a million grateful hearts.

On Wednesday, the 14th inst., the French residents of this city celebrated the anniversary of the fall of the Bastille in a very spirited manner. All their business houses were closed, and their residences and hotels were decorated richly with the national taste. The procession, in which they were joined by a detachment of Swiss residents, was excellent, and attracted an immense concourse of sympathizing spectators. In the evening at the Grand Opera House orations were delivered in English and French.

An important feature has been added to the business of the stock exchange. Hereafter all our local securities, such as the shares of gas, water, bank, insurance, railroad, powder and other companies, and National, State and county bonds, will be called daily at a short session held just prior to the informal session. Under this new rule the first call of these securities was made on Wednesday, the 19th inst.

Business in the city is generally quiet, and is likely to continue so for several weeks. After that the incoming crops will make it lively enough.

The Central Pacific Railroad Co. last month carried 2,840 passengers East and 3,100 West, making a total of 5,940.

Vital Importance of Sanitary Regulations.

Huxley, in his Lay Sermon devoted to the "Advisableness of improving Natural Knowledge," directs the attention of his readers to this deadly plague by which London was smitten in the memorable years of 1664-5; when "death, with every accompaniment of pain and terror, stalked through the narrow streets of old London, and changed their busy hum into a silence broken only by the wailing of the mourners of 50,000 dead." And the learned preacher enforces the lesson that the dire experience of mankind has always taught that the condition of health and life depends on the knowledge and observance of natural laws. Men are "learning that pestilences will only take up their abode among those who have prepared unwashed and ungarmented residences for them. Their cities must have narrow, unwashed streets, foul with accumulated garbage. Their houses must be ill-drained, ill-lighted, ill-ventilated. Their people must be ill-washed, ill-fed, ill-clothed. The London of 1665 was such a city. This city of the East, where plague and cholera have an enduring dwelling, are such cities. We in later times have learned somewhat of nature, and partly obey her; but because that knowledge is still very imperfect and that obedience still incomplete, typhus is our companion and cholera our occasional visitor." While it is true that London, with its teeming millions, is to-day freer from causes of fatal sickness than it was during the time of Milton, its sanitary regulations based on known natural laws are so incomplete as to be appalling. Just think of this condition of things existing in the foremost city of the world! Mr. Torrens, M. P., in treating in the *Macmillan Magazine* of the water supply of London, says that even in the Mansion House itself (as an instance of what occurs in in-door cisterns in the houses of the wealthy) the cistern "was found to contain three-quarters of an inch of fungi scrub at the top, and three-eighths of an inch of mud at the bottom," while "in a bottle of water on the Lord Mayor's table could be seen hundreds of nematoid worms." From cisterns thus situated "probably nearly one-third of the inhabitants of London obtain their only stock of drinking water; and when we reflect on the liability of water to absorb germs and ferments without actual contact, and to become putrid, under certain conditions, in a few hours, we can hardly escape a shudder."

We are unhappily only too familiar with the melancholy history of fever-stricken Memphis, where the yellow fever had come to appear as certainly as the return of the season. She was in many degrees just such a city to welcome pestilence as the pen of the master has described. Her late experience in the terrible loss of 15,000 lives, and of an incalculable sum in money, was a tremendous penalty for the disregard of natural laws. But Memphis has learned her costly lessons in the bitter school of experience, and has at last bravely attempted to cure and prevent the supreme evil which has afflicted her. She has put her own shoulders to the wheel to lift it out of the mud. She has adopted a perfect system of drainage and sewerage and water supply, and general sanitary regulations which are both intelligent and practicable. And now the Memphis *Appeal* boasts with a just pride that "it is the only subsoil-drained city in the world;" and that from "being wet and boggy, the soil has become dry and healthful; and from being the most unsanitary city, Memphis has become the most thoroughly clean and sanitary city on the continent." The coet of these improvements has been vast, but they will be found to be infinitely cheaper than one year's visitation of the fever.

Perhaps the most remarkable example of the woeful disregard of the simplest natural laws occurred recently at Princeton College—an institution especially founded for "increasing God's honor and bettering man's estate." An outbreak of malarial fever in the college building prostrated some 40 of the students, and has already caused eight deaths. This unlooked-for disaster has excited general discussion.

The history of the outbreak of the pestilential fever goes back a little more than a month. Prior to that time there had been the usual sickness in college, but the simultaneous prostration of seven of the students drew special attention to the fact and led to investigation. An analysis of all the wells from which the students drank was ordered, and the result was that the water in a dozen of the wells was found to be impure. The investigation begun by the faculty of the college has revealed a frightful condition of affairs. Several years ago water-closets were put into all the dormitories on the ground floor, while sinks were placed in each hallway for lavatory purposes mainly. The water came from a pure spring. The sewage was carried off in a 12-inch pipe across the college grounds to a large cesspool having an overflow pipe at one end. Neither sewer nor cesspool had any adequate ventilation. The investigation disclosed the appalling facts that the cesspool had never been cleaned and was full to the brim, and that the sewer was more or less choked by the hacking of the deposit. The drains from all of the dormitories connected with this cesspool. In most of the college buildings there was absolutely no har to the noxious gases in the sewer and cesspool from entering the bedrooms of the luckless students. The tainted atmosphere had become specially

offensive, and still the poison was permitted to do its work. The interposition of sickness and death at last aroused the college authorities to the shocking sanitary condition of the buildings, and they have at last sought the advice of scientific experts in order to correct their glaringly defective drainage. At the late commencement of the college, Pres. McCosh, who is both a good and learned man, in referring to this death by malarial poison of the eight students, asserted that the calamity was "a dispensation sent to chasten and humble us." This remarkable assertion was made with the full knowledge that the improvidences of the college authorities was alone responsible for the criminal negligence of the simplest sanitary provisions by which the college buildings were converted into breeders of filth-diseases. In the words of an acute thinker, the conditions of existence will not yield to man's perversity, nor relax because of his ignorance or weakness. "Obey or suffer," is the alternative.

Ore Crushing.—No. 3.

[Written for the Press by J. RICHARDS.]

Anyone acquainted with the processes of casting and annealing such pieces is aware of the uncertainty in deep sections, and that a central core is the surest way of avoiding inherent strains.

Stamp stems can be of cast iron, formed solid with the heads and tappets so as to be cheaper than the present form. In the Kendall movement and some others the vertical adjustment to compensate for the wear of dies is attained by shifting the cams so that fixed tappets are no objection.

These remarks upon the mechanical conditions to be met in constructing hollow stamps might be extended indefinitely, but enough has been said for the present purpose. The chipping of dies, clogging, size of hearings and so on can all be as well provided for as in the case of solid dies.

In comparing air, applied as indicated, with water, as at present employed, and keeping in mind the requirements before noted, we have first freeing the stamps from finished particles. This function water performs in a very imperfect manner; there are no currents in one direction to permanently carry off the particles; only the "swash" of the stamps. As soon as they raise the water flows back, carrying with it first the lighter and finer particles, which should be removed from the battery, and lastly the larger particles. With air the fine particles would be drawn to the center as the stamps raise and he carried off permanently if fine enough. There would be no waiting for them to be dashed by chance against screens. The coarser and heavier ones that found their way into the air duct would fall back again at the center of the dies, leaving the coarser ones at the periphery.

The second requirement, separation of fine particles from the coarse ones in the battery, is a function still more imperfectly performed by water. Fine particles, being more readily conveyed by the water, are carried farthest and to the top, but the conditions of working permit their mixture over and over again with the unfinished pieces. Separation by suspension cannot be said to take place, because such separation can only be performed by regular currents of nearly uniform strength. In water stamping separation is more the result of accident, and performed mechanically by the screens. With air the whole operation is different, regular currents can be maintained and so regulated that the "selection" it may be called would be complete. In the separation of other material, grain for example, ascent or descent of the particles is governed by the least difference in their gravity or friction, if of irregular form.

Air currents have been employed with some success in separating or precipitating gold from pulverized quartz or placer sand. Such a process shows a power of selection far beyond what would be required in removing the finished particles from a battery.

The third requirement named was the removal of pulp, or sand, from batteries. In respect to water as an agent for such removal, some of the previous remarks will apply. The wash through screens is in a sense accidental, not a direct result from a sufficient cause, but a forced result, with water as an assisting medium. To illustrate the difference between air and water as a means of removing the finished pulp, or sand, let it be supposed that a battery is fed with sand fine enough to pass through the screens. If water is used the delivery will not be much faster than if stone is fed from the breakers, but with an air current through the dies the probability is that the sand would all be drawn out as fast as it came between or near to the dies, and the battery he cleaned as rapidly as the current could carry the material.

The inference is, that this function, which water performs most imperfectly of all, would be that one most thoroughly accomplished by air.

Suspension and precipitation, named as the fourth condition, have already been explained as depending upon maintained currents. In water, when there are no direct currents, precipitation, or suspension, is the result of agitation or indirect currents. The limited quantity of water that can be used prevents the use

of direct currents. With air there is no such limit. Precipitation would be much the same whether air or water were employed. The mobility of particles would no doubt be greater in the case of water, unless the material was thoroughly dry in the air process, so there would be no adhesion from moisture.

In the application of air to dry crushing screens could be dispensed with. On the importance of this point no remarks are required.

The protection of machinery from dust would also be a gain resulting from the use of induced air currents.

The abrasives wear of iron casings or other parts from sand passing through, is easily avoided. A double air lock could be employed, or what would be no doubt the most simple plan, stamps could be connected by pipes with a large receiver into which the induction pipes would lead. This receiver could be made large enough to act as a temporary receptacle for sand or pulp, also to slow down the air current to any desired degree, so as to permit precipitation. By exhausting this receiver no dust or sand except that so fine as to be held in permanent suspension, would pass through the fans.

The writer, in 1861 and 1862, resided in Ohio what is believed to be the first pneumatic conveyors for dust and shavings used in this country; he subsequently introduced the system in Europe, and has from the first been intimately acquainted with the application of air currents in the sand-hast processes both in this country and in Europe.

This latter process in its various forms has no doubt led to the most thorough experiments in abrading hard material that have ever been made. These facts are mentioned to show that the conclusions in respect to ore pulverizing processes are not wholly from inference, nor without experience in analogous branches of engineering practice. The conclusions reached are as follows:

1. The failure of water to perform in a perfect manner the required functions in wet crushing renders that operation much slower than it would otherwise be.

2. That mineral stone of all kinds is more friable, and can be pulverized at less expense when dry.

3. That air currents applied as before described, will perform the functions required in dry crushing much more effectually than water does in wet crushing.

San Francisco, June 20, 1880.

POPULATION OF SAN FRANCISCO.—According to the returns of Supervisor Langley, the population of this city is 233,066, including 20,549 Chinese. There will probably be a slight increase in the total by the addition of absent residents and through the correction of errors in the returns of some of the enumerators. The census makes our population some 70,000 less than the estimates of the city directory. Those estimates were extravagant, of course; but there is little doubt that many thousands of people have left the city within the past three years for Oregon and Washington Territory, and for the mining regions generally. During the five years preceding 1876 the population of the city was swelled enormously by the attractions of the mining share market, and when that collapsed the tide of population began to ebb and carried off more than the flood brought in. It goes without saying that the number of Chinese in the city has always been greatly exaggerated; but the cold facts show that we have many more than enough.

MINERAL WEALTH OF JAPAN.—The Japanese government has now a thoroughly organized geological survey, comprising a full staff of native surveyors, under an American chief, Mr. B. L. Lyman. In his first report of the progress of survey, Mr. Lyman describes a journey which he made with some of his staff from June, 1878, to February, 1879, extending over a distance of 2,800 miles. He reckons that the coal fields of western Japan contain about 620,000,000 tons, and if one-third be deducted for the working, there will remain 400,000,000 tons, representing a value at the cost of \$1,000,000,000. Inconsiderable as this is in comparison with the large and rich coal fields of other lands, it is quite equal in value to all the metal products except iron. The copper of all the workable mines scarcely reaches the value of \$750,000,000. The eight or ten gold and silver mines, which were formerly worked, and may be soon again, may, including the lead, antimony and tin mines, the workability of which is doubtful, be valued at no more than \$250,000,000. On the other hand, the value of the iron amounts to at least \$250,000,000,000 or 250 times more than that of the coal. The relative importance of the mineral products of Japan (excluding Yesso and the small coal fields of Kii, Ise and Iwakai) may be represented by the following numbers: Iron, 1,000, coal, 4; copper, 3; and all other metals (chiefly gold and silver), 1. The total value of these products reaches the sum of about \$252,000,000,000—i. e., just as much as the coal fields in Yesso, which in other respects is so poor in natural products. Mr. Lyman gives some details concerning 24 of the hot springs in Shimotsuke, Uzen, Iwashiro and Ugo, and a table of the petroleum springs of Japan, according to which by far the most numerous and productive are in Echigo and in Akita, and the total delivery in the year 1879 was 4,525 gallons per day.

Ruins at Aztec Springs, in Southwestern Colorado.

One of the most interesting of the many groups of Aztec ruins scattered throughout Colorado, New Mexico and Arizona, are those at "Aztec Springs," located in a depression between the Mesa Verde and the Late mountains. It is said that, until within six or seven years, there has been a living spring at this place, located at the point marked on our illustration, the presence of which undoubtedly determined this as a desirable point for settlement. Hayden, in his report, says that these ruins form the most imposing pile of masonry yet found in Colorado. The whole group covers an area of about 450,000 square ft., and has an average depth of from three to four ft. This would give in the vicinity of 1,500,000 solid ft. of stono work. The stone used is chiefly of the fossiliferous limestone that outcrops along the base of the Mesa Verde a mile or more away, and its transportation to this place has doubtless been a great work for a people so totally without facilities.

The upper, probably principal, house is rectangular, measures 80 by 100 ft., and is built with the cardinal points to within 5°. The pile is from 12 to 15 ft. in height, and its massiveness suggests an original height at least twice as great. The plan is somewhat difficult to make out on account of the very great quantity of debris.

The walls seem to have been double, with a space of seven ft. between. A number of cross-walls at regular intervals indicate that this space has been divided into apartments, as seen in the plan.

The walls are 26 inches thick, and are built of roughly-dressed stones, which were probably laid in mortar, as in other cases.

The enclosed space, which is somewhat depressed, has two lines of debris, probably the remains of partition walls, separating it into the three apartments, *a*, *b*, *c*. Enclosing this great house is a net-work of fallen walls, so completely reduced that none of the stones seem to remain in place; and I am at a loss to determine whether they mark the site of a cluster of irregular apartments, having low, loosely-built walls, or whether they are the remains of some imposing adobe structure built after the manner of the ruined pueblos of the Rio Chaco.

Two well-defined circular enclosures, or *estufas*, are situated in the midst of the southern wing of the ruin. The upper one, *A*, is on the opposite side of the spring from the great house, is 60 ft. in diameter, and is surrounded by a low stone wall. West of the house is a small open court, which seems to have had a gateway opening out to the west, through the surrounding walls.

The lower house is 200 ft. in length by 180 in width, and its walls vary 15° from the cardinal points. The northern wall, *a*, is double, and contains a row of eight apartments about 7 ft. in width by 24 in length. The walls of the other sides are low, and seem to have served simply to enclose the great court, near the center of which is a large walled depression (*estufa B*). No other ruins were observed in the neighborhood of these, although small groups are said to exist along the base of the Late mountains, a few miles to the southwest.

The little squares which surround the more imposing portions of the ruins are probably the remains of less pretentious dwellings. They are not of uniform size; neither are they arranged in regular order. The walls are simply marked by low lines of loose rubble, the quantity of which would indicate nothing but a very low wall, and all of which, as well as the larger structures, when occupied, were covered with some kind of a roof. As they now appear, they are more like a cluster of open pens, such as are used at the present time by the Moqui tribe of Indians for the keeping of sheep and goats. A somewhat singular circumstance may be noticed, in connection with this portion of the ruins, viz.: the fact that the number of minor divisions in dwellings upon each side of the open or dividing space is exactly equal in number—70.

CAM AND TAPPET.—A correspondent asks whether it will require more power to lift a 750-pound stamp, 95 times a minute to a given height, with the center of the tappet 10 inches from the center of the cam shaft, than it would to do the same work in the same time, with the center of the tappet directly over the center of the cam shaft. Our answer is that the same power will do the same work in the same time in either case, provided the friction in both cases is the same. It is simply the old question of a long or short lever in a new shape—what you gain in power you lose in speed.

PERSONAL.—Bierstadt, the artist, and Capt. James B. Eads, the civil engineer, are announced to arrive here this week. Capt. Eads, having been appointed Consulting Engineer of the State, will confer with the State Engineer in reference to the projected improvement of the Sacramento river.

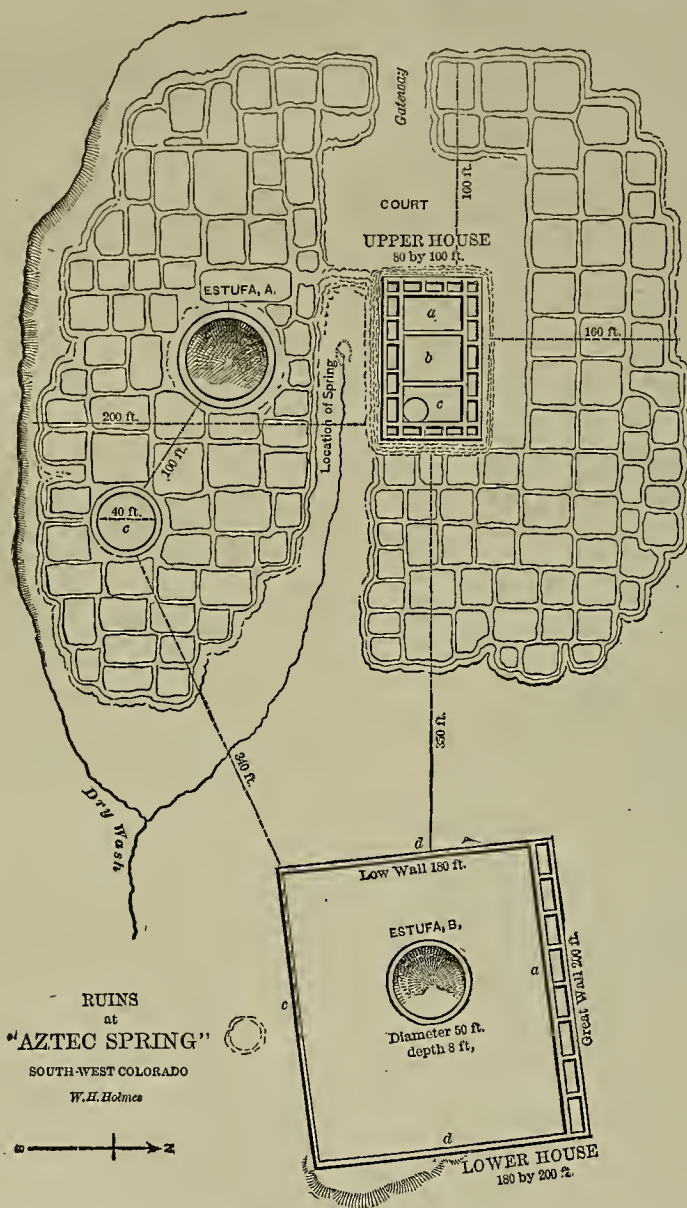
The Plumas Eureka Mining Co. is contemplating adding 20 more stamps to its lower mill. This will give it 100 stamps in all.

Void Entries of Public Lands.

Commissioner Williamson, of the General Land Office, issued July 9th a series of detailed instructions to all registers and receivers which prescribe the regulations necessary for carrying into effect the law enacted at the last session of Congress for refunding all excess of payments of ordinary purchase money, fees and commissions of void entries of public lands. The act affects thousands of settlers throughout the Western States and Territories. The first section authorizes the repayment to "innocent parties" of fees and commissions paid by them on entries of fraudulent "soldiers' and sailors' additional homestead scrip," of which very large quantities were set apart in Western States some years ago. Commissioner Williamson's instructions require thorough proof of the innocence of applicants for relief under this section. The second section provides for the repayment of the purchase money and of fees,

tions for repayment are to be transmitted, together with all papers in the case, to the Commissioner of General Land Office, through the registers and receivers of the proper districts, who are required to make a due report upon each case transmitted, and the money finally found due will be paid out of the Treasury upon the warrant of the Secretary of the Interior.

MINING OPERATION IN IDAHO.—A company known as the Wood River G. and S. M. Co. was recently organized in Salt Lake City, says the *Tribune*, to work certain gold and silver mines in Alturas Co., Idaho. The officers are: Col. S. A. Merritt, President; J. D. Thompson, Vice-President; W. S. McCormick, Treasurer; Louis L. Davis, Secretary, and M. Lipman, Superintendent. The property is about 150 miles, over a good road, from Blackfoot station, on the Utah and Northern railroad. A few days since a discovery of wonderfully rich ore was made in the Bullion mine. Two assays were made, one of which yielded at the rate



commissions and excess payments in all cases where entries of public lands have been cancelled, or for conflict, or where from any cause the entry has been erroneously allowed by local land officers and cannot be confirmed, and also for refunding the extra \$1.25 per acre paid by settlers for lands supposed to be "double minimum lands," within railroad limits, but afterwards discovered to be outside of such limits, and therefore purchasable at the ordinary minimum price of \$1.25 per acre. All these repayments may be made to the party who made the original entry, or to his heirs, executors or administrators, or to any assignee specially authorized to receive such repayment, but the mere conveyance of land will not be deemed to carry with it the right of repayment, unless expressly so stated in the assignment. Where there has been a conveyance of land and the original purchaser applies for repayment, he must conclusively show he has indemnified his assignee, or perfected the title in him through another source. Assignees of title to land must show by affidavit otherwise that they have not been indemnified by their grantors for failure of such title. Where there is a specific assignment of purchase money, evidence of non-indemnification by grantor is not required. In case of desert land entries, assignees of purchase money are only assignees. Recognized applica-

per ton of 954 ounces in silver, with 68% of lead, and the other 500 ounces in silver, with 60% of lead. The Bullion is described as being over 80 ft. in width, between lime and quartzite, with 3 pay streaks running through it on the surface. One is 20 inches wide on a hanging wall, and seems composed of such ore as gives the large assay noted above. The next is near the center and is about 3 ft. in width, while the third is on the foot wall and is 20 inches wide. The two latter strata carry the 500-oz. ores. The Bullion discovery was made only a few days since, and the result has been to advance the stock \$10 per share. The company will set 17 men to work this week and commence at once to ship ore to this city. The strike in the Bullion is considered one of the most important ever made in the Northern country.

The plan for utilizing Genesee falls is really being carried out. The power is to be controlled by letting the water fall into perpendicular cylinders in such a manner as to compress air with tremendous force; and this air is to be conducted in pipes to various points for use in running machinery. The first novel application of the power will be to the propulsion of street cars. If the scheme proves successful, Niagara will be tried.

Letter from the Comstock.—No. 3.

EDITORS PRESS.—The declaring of a dividend by the Con. Virginia is considered by a good many as the foreshadowing of a better era, but why is more than anyone can tell. The old Bonanza mines might declare a good many dividends yet if the proceeds of the tailings, which are now being worked "very close" by the owners, were to go to the stockholders. Had the same care been taken to work the ore close, these dividends would have gone right on to date. The same steady preparation still goes on at the north end. I am pleased to say that there are hopeful signs in the south drift on the 2500 of the Union, and it is about 15 ft. in quartz that runs from \$2 to \$25. The other drifts mentioned in my last letter have been extended at about the usual pace, without encountering anything worthy of note.

On Friday there was talk of the northeast drift from the Union shaft being in rich ore, but this is most improbable. No one expected it at that point, and unless the ledge has been cramped up, like a boy with the stomach-ache, there is nothing in such a report. The north drift of the 2400 of the Sierra Nevada has now been extended nearly 1,000 ft., almost long enough to run some cross-cuts from. A chamber is being cut out in the west drift of the 2300 at a point 253 ft. from the beginning. The above is simply the state of the mines at that point, and it seems rather common-place to people who are daily looking for some big improvement. If the persons who are so impatient over the slowness of the work, would but spend a couple of days in the lower levels and see for themselves how much has been done, and how much yet remains, they would be quite content to wait a while yet.

Bodie stocks really deserve more attention than they are now receiving. The camp is not so easy of access as Virginia City, and comparatively few people reach it. During the past few months some of the leading capitalists of the coast have given the Bodie mines a thorough inspection, and only speak of them in the highest terms. The Noondays are now looked upon with much favor. The mines are at present paying off a heavy indebtedness, and when they get this dead horse out of the way, no one need be surprised at the suddenness and extent of their prominence. Woe to the man who at that time does not have a few of the shares laid away. Experts agree that there is enough ore now in sight to keep the mills running for years. When the company gets out of debt for its splendid machinery it will positively pay dividends. The Standard is also in prime condition, and in the fall, numbers more, now considered small fry stock, will come into prominence. The new road now being opened from Carson will materially advance the interests of the Bodie district, and will also open up a country 150 miles further south. A good deal is being said in the Carson papers about the Zabriskie mine. Numerous attempts have been made to sell it, but they have failed to find a customer. So far about the only ore that has been found exists in the imagination of the writers who hold the stock.

The talk of putting men to work above the tunnel level for \$3 has as yet taken no shape, and the miners who say that no work shall ever be done at that price are now engaged on the narrow-gauge road to Bodie at \$1.50 a day. While this stubbornness is being kept up, the miners are being discharged from the Comstock in scores every day, and the vitality of the ledge is ebbing away. Were there a reduction in milling and railroading charges the Miners' Union will, it is said, agree to come down; but each side waits for the other. So far as the railroad company is concerned, D. O. Mills will make no reduction, even if the Comstock sinks through to China. He has always maintained this policy, and always will. There is a general feeling this year that a Legislature must be elected which will regulate this state of affairs, but experience teaches us that we must not hope.

In a week from now the Union pump will be running. It will take water from the 2500 level and enable work to go on east of the ore body. It is the most important piece of work done on the ground for nearly a year. The Yellow Jacket stockholders are still paying enormous sums of money to keep the pumps running, when by connecting with the south branch of the Sutor tunnel the water might all be carried out that way. Why this is not done is more than anybody knows.

The report that John Mackay was about to leave the Comstock during the present month has been used by the bears. He will not go to Paris before fall, when Col. James Fair will return and take his place. Mackay will then not be gone over two months.

HAND DRILL.

It is probable that a hydraulic balance pump will presently be put in at the Chollar-Norcross-Savage shaft. No such pump is now in use anywhere in the United States. Such pumps are used in some of the deep mines of Germany.

MINARET district is the last one organized in Mono county. This district immediately joins Lake on the north, and North Fork and Mountain View on the south. Fresno county men own many of the claims.

Our Abnormal Gold Coinage.

From the 30th of June, 1849, to the 30th of June, 1879, our mints have been steadily operated to the end of making it impossible for our people to use gold in their daily business dealings, as the French and English people do, by coining it into 20-dollar pieces, as may be seen from the fact that out of a gold coinage for these 30 years of \$999,480,339, no less than \$898,239,120 were in these same 20-dollar pieces, a coin altogether exceptional among commercial nations. Any system more cleverly contrived to force our people to carry on their daily dealings with each other in paper or credit money, it would be impossible to conceive, or one which more thoroughly sets aside gold for the exclusive convenience and behoof of the capital classes and moneyed institutions of the country, while facilitating its exportation abroad, there to be turned into sovereigns for the English, and into four-dollar pieces for the French people.

Strange to say, never a word had been said in opposition to this utterly exceptional species of money or in exposure of the evil effects of it, until this journal pointed out its features. However, since the present director of the mints has been in office there has been a disposition apparent to give the people some use of gold; at least, so far as to coin five-dollar pieces which, let us note, are 20% larger than the largest coin of the immense gold circulation in France, and a considerable fraction larger than the largest coin minted in England and Germany. But even with the best intentions, Mr. Burchard, as yet, has been unable to lift the mints out of the deep rut in which they have been running these 30 years.

For May, we perceive, that while an aggregate gold coinage of all the mints of \$4,427,845, only \$980,000—about 22%—were of these 20-dollar pieces, as much as \$1,912,300, or 40%, however, were in 10-dollar pieces, which are as exceptional, and nearly as objectionable for currency uses as the double eagle. Therefore, 62% of the May gold coinage was of these uncurrent pieces, and a continuation of the system which reverses the practice of all other commercial peoples, whose habit it is to use paper in large transactions and keep the precious metals largely for currency in retail dealings. The balance, 38%, was in five-dollar pieces. As in the last 12 months, the coinage of double eagles has not amounted to less than \$30,000,000, surely our mints might now be rightly turned aside for some time from their coinage, without inconvenience to anyone, and coin, say one-fourth in eagles, one-half in half eagles and one-fourth in quarter eagles. There is enough double eagles in the Treasury to pay out to depositors of bullion, who may exact such coins in return. The coinage exclusively of small gold—half and quarter eagles—would be timely and wholesome as a check upon exportation, made so facile and convenient, under the double eagle system.—*Mining Record.*

Reporting by Telephone.

The method of reporting late debates in the House of Commons by telephone, lately adopted by the London *Times*, is thus described by that journal. A type-setting machine has for some time been used in the office, by which a fair workman can attain an average speed of 100 lines an hour, even when composing from manuscript which he has to read for himself; and this speed can be doubled, or nearly so, when the operator is assisted by a reader, and thus composes from dictation. Now the telephone has been brought into use in connection with this machine in the following mode. Having obtained the permission to lay down the necessary wires we formed a new connection between the House of Commons and the office, and placed one of Edison's loud speaking telephones at either end. The immediate result of this arrangement has been to bring the compositor at the machine into direct communication with the parliamentary reporter at the House and to enable the debates to be reported and printed from half to three-quarters of an hour later than had previously been possible. The notes made by the reporter can be read directly into the telephone-receiver in a room adjoining the gallery either by the reporter himself when relieved or by another person employed for the purpose, and the compositor at the machine, in the office, sits with his ears in juxtaposition with the other terminal of the instrument.

The plan which has been found the most efficacious for the purpose of shutting out distracting sounds of other kinds is to place the disc of the telephone above and behind the compositor and then to arrange two tubes, each with two trumpet-shaped extremities in such a manner that these extremities are applied at one end to the two sides of the telephone disc and at the other end to the two ears of the compositor. The compositor is also furnished with a speaking instrument, with a key for ringing a bell and with a bell which is rung from the House—a simple code of bell signals, consisting of one, two, or three strokes, sufficing for the ordinary requirements of each message. The compositor announces by the bell that he is ready, receives a sentence, strikes the bell to indicate that he understands it, sets up the type with his machine, strikes the bell again for the reader to continue his dictations, and so on until the work is carried as far as time will allow. If there is any doubt or difficulty about the words a bell signal will cause them to be repeated, or explanations can be sought

and received by direct vocal communication. In this power indeed resides one of the chief advantages of the method, and one which ought to lead to greater accuracy than has ever previously been attainable. The names of people, places, etc., can be spelled out letter by letter if there is any doubt about them.

The Mongollon Mines.

A correspondent of the Los Angeles *Herald* has furnished that paper with the following account of the Mongollon mines, New Mexico:

On looking over some of the Pacific coast papers I see with great pleasure that the attention of California miners and capitalists has been turned in the direction of the late unexcelled discoveries of silver ore in Arizona and New Mexico. Nevada may have shown larger ore bodies, but as far as rich ores are concerned the present finds in Arizona and New Mexico will be considered remarkable, especially as the new discoveries are not confined to one or two localities, but cover nearly every known mountain range in the two Territories. So much has been written about the developments in the central and southeastern part of Arizona that it will not be necessary for me to touch upon their different merits, and I will confine myself to giving a short description of our new mining camp in the Mongollon mountains.

The mines are situated a distance of 80 miles northwest from Silver City, and near the San Francisco river, in the first rise of the Mongollon mountains, and are easy of access. The locality is very well supplied with timber of every description, and as far as water is concerned the supply is unlimited, six running streams crossing the belt at right angles, whilst numerous springs on the mountain sides furnish the necessary drinking water for the higher lying mines. The formation of the camp is granite and porphyry, the veins running north and south, and cropping in bold relief, traceable for miles, showing high-grade pay chimneys on almost every location that has been made. All ores found in the district are of the copper and silver glance variety, and assay from 15% to 85% copper, and from 30 ounces up to 1,700 ounces of silver, the great average of the ore running about 35% copper and 250 ounces of silver. The veins are in granite, and are generally true fissure, with a marked dip to the northeast, and show a width of from 2 to 40 ft.

The Silver Bar mine, the best developed mine in the camp, crops for a distance of 800 ft. in solid metal. A crosscut being driven in the vein has penetrated a body of ore 17 ft. wide and rich in silver glance and native silver, exposing a bed of ore that can only be guessed at by the thousands of tons, of exceptional richness. A great many other locations show similar results on a somewhat smaller scale.

The Mongollon mines were discovered several years ago, but, on account of their remoteness from the nearest point for supplies, and the continued harassments from the hostile Indians, the developments have not gone ahead on as large a scale as would have been the case if the mines had been found in almost any other locality. As soon as the Indian question is settled, the Mongollons will show what they are—they will show the highest and richest mining camp south of Colorado.

DEMAND FOR GAS ENGINES.—Those connected with the manufacture of illuminating gas in this country appear to be gradually coming to a sense of the necessity of building up additional markets for their product. They are now making strong efforts to aid the introduction of gas engines. At a recent meeting of the Western Gas Association, at Indianapolis, Mr. J. O. King, president, in his address stated that the demand for gas engines is so great that manufacturers are unable to meet it with any promptness. Mr. Ramsdell, of Vincennes, Ind., speaking on the subject, gave a brief account of the experience which he had had with the Otto silent gas engine. A 17-horse power engine operated two elevator belts, lifting the grain in 8 and 12-inch buckets 60 ft. high, 10-inch conveyers 135 ft. in length, one wheat cleaner and fan and one pump. To do this it consumed 200 cubic ft. of gas per hour. The chief advantage brought out was that it is admirably adapted for light and intermittent work. In addition to this wheat machinery there was complete machinery for handling corn, besides the elevator and conveyers, used also for the wheat, one No. 2 corn sheller and machinery, etc. Another, a 14-horse power engine, operated the machinery of a local newspaper, from three to four hours a day, at a consumption of 1,000 cubic ft. of gas per month. The gas engineers, it seems, are considerably impressed with the importance of the subject.

THE TAY BRIDGE DISASTER.—The Tay bridge commissioners have presented two reports. The majority report censures more or less severely the contractors, engineer and North British Railway Company. The design of the bridge is condemned, and the company charged with neglecting to keep it in proper repair. Although the construction of the bridge was faulty, the commissioners believe it might have weathered the storm and lasted for years had it been kept in thorough repair. The minority report arrives at substantially the same conclusion, but differs on matters of detail.

ACCORDING to a German journal, vessels of platinum are to some extent attacked and corroded by the carbonates of potash and soda at their melting point.

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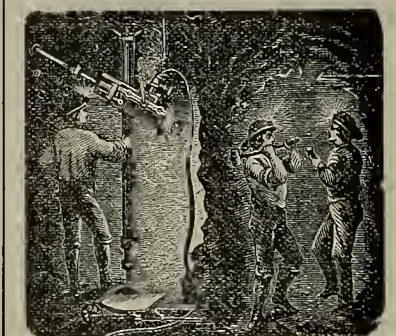
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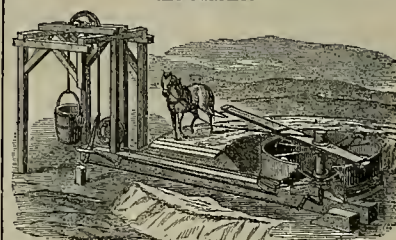
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In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

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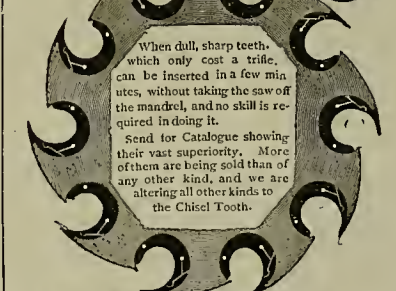
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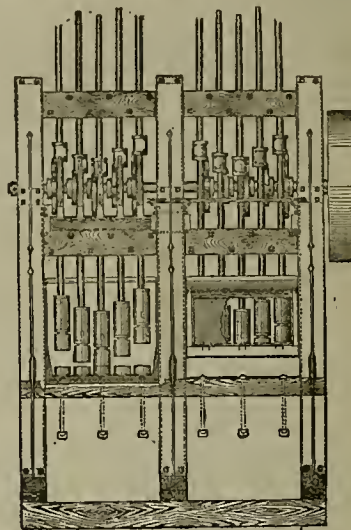
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING JULY 6, 1880.

229,586.—EXTRACTING METALS FROM ORES.—T. C. Clark, Oakland, Cal.
229,590.—FIRE KINDLER.—H. Finck, S. F.
229,593.—FILLING GUNS.—L. Cutting, S. F.
229,606.—SAFETY CLUTCH.—B. E. Henriksen, S. F.
229,599.—CHURN.—Geo. W. Freeman, Rocky Point, Cal.
229,619.—COMPASSES.—J. D. Little, Petaluma, Cal.
229,624.—DERRICK.—E. J. Marsters, Stockton, Cal.
229,636.—GUIDE ROLLER.—T. Pusey, Stockton, Cal.
229,625.—BILLIARD TABLE.—S. R. Mathewson, S. F.
229,632.—GRAIN SCREEN.—B. F. Pettit, San Luis Obispo, Cal.
229,637.—FAUCET.—C. C. Redmond and A. W. White, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions* rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

Eagleton Manfg Co. vs. West, Bradley & Cary Manfg Co. et al.

U. S. Circuit Court, Southern District of New York.—Decided June 9, 1880; Wheeler J.

1. If a patent was not accompanied by an application the date of the patent would be deemed the date of the invention; and the application to be effective evidence to carry the date of the invention back to its own date, must be an application for substantially the same invention for which the patent is granted, without material variation or addition.

2. When the application fails to take the date of the invention back of the date of the patent, and the defendant makes out prior knowledge and use by others beyond any fair or reasonable doubt, as the law requires, the burden is shifted on to the plaintiff to show invention or discovery by the patentee still prior to that.

3. An inventor need not know all uses to which his invention is capable of being put, but there must be some patentable invention patented before any use of it can be covered by the patent.

4. The proceedings of the Patent Office are presumed to be regular and founded upon proper proceedings; but they must necessarily be founded upon the application of living persons or their personal representatives, such as the law recognizes, and not upon those of persons who are merely supposed to exist, and should be founded upon the oath of the inventor or his personal representative in accordance with the statute.

5. An application made and sworn to June 26, 1868, by an inventor who died in February, 1870. Amended November 7, 1871, by the introduction of the substantial part of the thing patented by persons who had been his attorneys, unsupported by the oath of his personal representative, not a valid foundation for a patent.

6. Patent No. 122,001, dated December 19, 1871, issued to J. Joseph Eagleton, Sarah N. Eagleton, Administratrix, for an improvement in Japanese furniture springs, granted upon such an application, never had a valid existence.

Bill of complaint dismissed with costs.

Sinclair et al. vs. Backus.

U. S. Circuit Court, District of Massachusetts.—Decided January 27, 1880; Lowell J.

1. Quere whether, when a patentee has made an original invention which is confessedly an improvement upon all old machines, he is conclusively presumed to have known every lost and forgotten machine in the line of his art, and therefore must prove invention over the best of them, as he undoubtedly must be presumed to know of any machine which fully embodied his invention.

2. A patentee is entitled to protection for improvements made by him, notwithstanding the prior existence of a device having the same capacity, but differing in structure.

3. Experimental use occurring more than two years prior to the filing of the application is not fatal to a patent, even though the use was for the purpose of satisfying others as to its utility.

Decree for complainants.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

EXTRACTING METALS FROM ORE.—Thomas C. Clark, Oakland, Cal. Patented July 6, 1880, No. 229,586. The object of this invention is to perform the disintegration and desulphurization of ores so as to bring the said ore into proper condition for easy pulverization, and the precious metals contained therein into a suitable form for amalgamation, by freeing them from the union and influence of haser metals. In order to accomplish this object, the ore is crushed into pieces about the size of ordinary Indian corn. That portion containing sulphurets generally becomes finer, since it is more friable. The object of crushing it to this size is to prevent loss of gold and facilitate washing operation. The ore, after being crushed as described, is placed in an ordinary roasting furnace. After being roasted for a suitable length of time, the heat is raised, so the sulphur will turn freely, after which the heat is let down again, a free supply of oxygen being furnished during the whole process of roasting. After the ore has become dead and lies like sand in the furnace, and no more ecintillation is apparent, it is heated up to a good red heat, but not made too hot. In a suitable receptacle beside the furnace a cold bath is formed, in which the ore is drawn while in its heated condition, fresh from the furnace. This bath is formed of a solution of salt, prussiate of potash, and caustic soda or caustic potash.

DIVIDING-COMPASS.—John D. Little, Petaluma, Cal. Patented July 6, 1880. No. 229,619. In this ordinary carpenter's compass an arc is attached to one leg and passes through a slot in the leg, a set-crew passing into this slot, so as to impinge on the side of the arc and secure the moving leg to the arc. After a measurement has been taken, this set-crew is turned and the measure retained. In doing this, both hands must be used—one to open or adjust the compass, and the other to set the screw. This set-crew, moreover, wears out rapidly and does not always work satisfactorily. In this improved method of securing the moving leg to the arc, only one hand has to be used to manipulate both compass and retaining device—this retaining device being of such a character as to be very durable and easily operated.

CHURN.—George W. Freeman, Rocky Point, Sierra county, Cal. Patented July 6, 1880. No. 229,599. The inside of the churn has peculiarly shaped corrugations, formed longitudinally through it, so as to prevent the butter from slipping while working it. Small strips of wood extend from the ends of the churn lengthwise and fit into the backs of the corrugations, so the zinc which forms a cooling cylinder will not be bent, and the form of the ledges or corrugations will not be altered. This enables the churn to be cleansed much better than could be done if strips of separate material were introduced to form the ledges. The device also contains other novel features which form a complete butter-worker without the necessity of using hands or other apparatus.

GRAIN SCREEN.—Benjamin E. Pettit, San Luis Obispo, Cal. Patented July 6, 1880. No. 229,632. This invention relates to certain improvements in screens or sieves for separating grains, and cleaning grain of chaff, and other worthless seeds and foreign substances. It consists in the construction of the metallic plate of which the sieve is made, with slits which are cut and raised to such a height and width; and to permit the passages of seeds, grains and other matter it is intended to save, those of larger size not passing through, but being directed off at the end. The peculiar construction of the sieve is such that this separation depends on differences of size or shape, and not on specific gravity of the grain or seeds, and different sized slots may be used for different grain.

BILLIARD TABLES.—S. R. Mathewson, 28 New Montgomery St., S. F. Patented July 6, 1880. No. 229,625. This invention consists in forming the cushion or sides of the table of one or more pieces of straight wire passing around studs at the corners, in combination with an adjusting device so arranged that the slack may be taken up in order that the wire may be kept at such a tension as to provide an elastic medium for the balls to rebound from. It also relates to a peculiar method of forming the studs which control the wire. It also further consists of peculiar construction of the surface in combination with a billiard table.

SAFETY CLUTCH.—B. E. Henriksen, Throlock, S. F. Patented July 6, 1880. No. 229,606. This invention relates to certain improvements in elevators and hoists of any description, and its object is to secure the same against the sudden fall or violent and rapid descent usually caused by the breaking of the cable or derangement of the hoisting apparatus. It consists in the employment of certain levers and catches in connection with the elevator frame, which will be actuated by any unusual speed of the descending cage or platform, and cause it to stop.

AIR COMPRESSOR.—Henry Richmann, S. F. Patented June 29, 1880. No. 229,468. This invention consists, first, in providing a peculiarly shaped double crank for communicating the power from the steam cylinder to the air compressing piston, the crank for the cross-slide of the steam cylinder being formed in one piece, with that for the cross-slide of the air cylinder. Second, in providing for the pistons of the air cylinders double piston rods, whereby the pistons are more evenly balanced and room left in the cylinder heads for valves of large area. Third, in constructing the pillars and bed pieces of the frame work hollow, and so connecting them that said frame shall act as an air receiver.

FIRE-KINDLERS.—Henry Finck, S. F. Patented July 6, 1880. No. 229,596. This invention relates to that class of fire-kindlers wherein a series of hits of wood are coated with resinous, oleaginous matter, and consists in fagoting or binding together the hits of wood or other material by means of the tenacity of the inflammable matter into which they are dipped, so as to avoid the use of nails, or tacks, or offsets in fastening them.

GOLD-SAVING APPARATUS.—Bryan Tyson, Washington, D. C. Patented July 6, 1880. No. 229,650. This invention relates to certain improvements in apparatus for saving precious metals, quicksilver, etc., which may be contained in pulp, tailings or other form of pulverized ore; and it consists in an adjustable trap located in the main flume to lead the tailings to a short sluice provided with transverse, fixed and movable riffle bars, the tailings then passing to an oscillating pan or jigger for concentration.

The State Fair of 1880.

The State fair of 1880, commencing September 20th and ending September 25th, will be the first under the auspices and direct control and management of the State. This fact should and will invest its proceedings with a more official character, and give them a greater dignity and weight. Its records will go abroad as State documents, stamped with official authority, and hearing the indorsement of every citizen of the commonwealth. It becomes, therefore, a matter of greater importance than heretofore, not only to the State, but to each individual citizen interested in the welfare of the State, that the fair should be made a true and full exposition of all the known material resources of the territory within our borders, of all the industries and industrial productions of the State, and of all the tangible evidences of the substantial prosperity of the people.

While the members of the Board of Agriculture, who give their time and services without fee or reward, except that which comes from the satisfaction of having benefited their adopted State, propose to exert their best endeavors to make the society and the fair what they should be, they know that they can do but little unless their efforts are seconded by the people who develop those resources, conduct and manage those industries, and enjoy that prosperity. What is true of the State Board of Agriculture in this respect is equally true of each District Board. They can do but little towards advancing the material prosperity of their districts without the aid of the people of the districts. With this aid, the District and State Associations, as now organized, working in harmony for a general purpose, may contribute greatly to this general prosperity, and add millions annually to the wealth of this State.

The first thing for any one to do who desires to show the products of his farm or workshop is to send to I. N. Hoeg, Secretary, Sacramento, for a copy of the new premium list. It has been issued by the State printing office in excellent style, and contains a full enumeration of awards, rules for competition, etc. There are over \$20,000 offered as premiums, and the money, so far as our examination goes, seems better apportioned than it has ever been before. There is also provision for fair awards to worthy articles which may not be named in the list, so that anything good and valuable should be brought forward.

There will be especial encouragement to exhibitors, from the fact that the Central Pacific Railroad Company will carry all articles and animals exhibited at the fair, over its respective routes, free of charge, under the following rules: Charges will be collected for transportation to the fair. After exhibition, the articles, if consigned direct to original shipping point, and the ownership has not changed, will be returned free; and the charges paid for transportation to the fair will be refunded by the railroad agent at destination, upon presentation of the Secretary's certificate of exhibition and surrender of the expense bill for freight charges paid at Sacramento. The same company will issue excursion tickets to all parties going to the fair and returning, at about half price.

For the accommodation of families and parties desiring to camp out during the fair, the board have secured ample grounds for that purpose within easy access to the pavilion and the park. By availing themselves of this opportunity, the attendance at the State fair may be made a pleasant camping tour by parties at a distance, at small expense. Our climate is most favorable for the introduction of this custom while attending our State fairs.

The managers of this year's fair seem to be making extra efforts for the success of the exhibition, and we trust they will attain it. On another page of this issue we print the speed programme of this year's fair.

"DAILY JOURNAL OF COMMERCE."—An interesting event in the history of commercial journalism in this city is the appearance, during the present week, of the first issue of the *Daily Journal of Commerce*. The new *Journal* is from the well-known establishment which has published the weekly of the same name for a number of years. The great trade of this city calls for a daily record of market values, the movements of merchandise and produce by ship and rail, and other matters which enter into correct judgments on trade questions. Into this field the new *Daily Journal of Commerce* will enter, and it should receive the support and encouragement of the mercantile interest.

EFFECTS OF THE BICYCLE.—It is common now in the English metropolis to meet with young men who are prematurely round-shouldered and walk with bent knees and a sort of arch-like movement. Riders of the so-called "steel horse" may be interested to know that this ungraceful appearance has been named the "hicycle back" in honor of the pastime that causes it.

A LETTER from Hequicht, on the west coast of Vancouver's island, states that at that station alone 900 fur seals have been hought. The few Indians settled there have made over \$5,000 in two months. Some made as high as \$120 apiece in one day; many from \$30 to \$80 each.

News in Brief.

TOM TAYLOR, the dramatist, died suddenly in London, July 12th.

CONSIDERABLE damage was caused by a cloud-hurst near Yreka, Siskiyou Co., July 5th. HENRY M. STANLEY has been made a doctor of philosophy by the German Academy of Naturalists.

The entire press of Texas, without exception, condemn in the strongest terms the acquittal of Currie.

Two colored boys have passed the examinations for entrance to the Reading (Pa.) High School.

In this city Robert Neil, a twelve-year-old boy, committed suicide rather than he returned to school.

The increase of acreage in grain in Wasco county, Oregon, is five times what it was three years ago.

From the agricultural districts of France come reports of good weather and prospects of a rich harvest.

THERE were 40,000 cars huilt in the United States last year, and there will be about 50,000 huilt this year.

THE Snake river in Oregon was rechristened by the Villard party, and now goes by the name of the Lewis river.

ADJUTANT-GEN. JONES of Texas reports that the State has about 6,000 criminals at large, 1,000 of them murderers.

A BANQUET took place in Liverpool, July 5th, given by the United States Consul in honor of Independences Day.

A COOL wave struck Salt Lake July 12th, and snow fell in the Wasatch mountains to a depth of four inches.

THE peasants of Lombardy live chiefly on black bread and a broth made of rices, a few vegetables and rancid oil.

It is said that young laborers will soon become scarce in Ireland if the present rate of emigration continues.

ONE of the census enumerators of McLennan county, Texas, found a widow 35 years old with a son 27 years of age.

IN Mono Co., Cal., there is a giant juniper tree fully 60 ft. in circumference, with limbs five to six ft. in diameter.

SAYS the *Merced Express*: A good crop of wheat in this county is always succeeded by a large fall crop of weddings.

THE visible supply of petroleum is the largest known in the history of the trade, being estimated at 9,000,000 to 10,000,000 barrels.

SAMUEL P. BOWLES, ex-County Engineer, of Cincinnati, convicted of forging county bonds, was sentenced to ten years in the penitentiary.

THE *Big Horn* was the first boat out of the Yellowstone this season, and brought down 5,000 buffalo robes and large quantities of furs.

BERKELEY SPRINGS, Va., is said to be the oldest watering place in the country, dating from the aborigines, who discovered the virtues of the waters.

A SUIT for \$25,000 has been brought against the city of Augusta, Ga., for injuries to a child that had been gored by a cow running loose in the streets.

THE old whipping-post in Raleigh, N. C., which had been used as a hitching-post since 1868, has disappeared from its place near the Court-house.

LIGHT wines, bread, coffee, salad, vegetables and fruit form the staple diet of the working-men of Paris. The vegetables are good, plentiful and cheap.

THE Belgian Bishops have advised the Vatican that their action will be more free and powerful since the rupture of diplomatic relations with Belgium.

A BRITISH ship has sailed for Texas with 3,500 barrels of oil, made for the purpose of preserving railroad ties and bridge timbers under a new process.

THERE are 38 Masonic Lodges in Washington Territory, representing something over 1,000 members, St. Johns of Seattle being the largest, it having 80 members.

THE scheme of mutual aid among the Masone of Mississippi, inaugurated in February last, is an assured success. The membership within the year will number 2,000.

THE crops of able ladies who make *Demorest's Monthly* so attractive to their sex, has filled the July number with all manner of interesting and instructive things.

IN Switzerland, July 4th, there occurred a severe and widespread earthquake. A large area of wooded land was covered, and two persons are known to have been killed.

WHILE a mail agent of Little Rock was handling a mail pouch rather roughly, a loud explosion occurred inside of it. It was caused by a loaded revolver mailed by a Texan.

CALIFORNIA'S wool clip this year (spring and fall) will probably be not less than 35,000,000 lbs. The total value of it promises to be nearly double that of any preceding wool crop.

A DRUNKEN driver, July 12th, while driving from the Glen House to the summit of Mount Washington, N. H., capsize the stage containing nine persons, killing one and seriously injuring five others. He was fatally injured.

IN the heart of a large pine tree, recently cut down by Jonathan Oakley, of Unadilla Forks, N. Y., was found an Indian pipe of stone, with the date roughly carved on it, 1783.

A NEW YORK man was challenged to fight a duel the other day, and being at liberty to choose his own weapons, proposed a trip to Boston on a Sound steamer. The challenger backed out.

The Mechanics' Fair Daily.

By authority of the BOARD OF MANAGERS OF THE MECHANICS' INSTITUTE FAIR the publishers of the MINING AND SCIENTIFIC PRESS will issue a large edition of the ELEVENTH VOLUME of the MECHANICS' FAIR DAILY during the FIFTEENTH INDUSTRIAL EXHIBITION, which opens in San Francisco, Tuesday, August 10th, 1880.

It will be of large size, printed and circulated FREE in the Pavilion, and contain the day and evening programme, a list of exhibits, and official bulletin of the Institute.

Its columns will embrace a large variety of important industrial and scientific information, illustrations and well written descriptions of the general features and most deserving and novel exhibits in the Fair, a record of the Fair and incidents of its daily progress—gay, serious and comic—as they occur.

The best of editorial, reportorial and corresponding talent will be employed, with a view to make the paper of live interest in all its departments and of standard value as a full record of the great exhibition, the wonderful inventions, rich resource and rapid progress of our great Western Community.

More than ONE HUNDRED THOUSAND different individuals will read copies of our paper during the Fair. The novel character of the journal—the specially attractive features of its free issue in the Pavilion, and its absorbing interest to visitors at the Fair, the attention its columns command when brought into the shop and family circle by those who receive it freely at the Fair, make the paper a powerful advertising medium.

The Managers have granted us the exclusive advertising and printing privileges, and will receive no advertising in the official catalogue and reports.

Our ten previous volumes have met with unrivaled success and gratifying results to advertisers, nearly all of whom were leading and first-class business firms.

Many thousands of marked copies were sent by mail and otherwise to friends near and distant, giving the FAIR DAILY a more broadcast and universal circulation than any other newspaper published.

Its columns are more closely examined throughout than those of any ordinary publication.

By past experience, ample facilities, and a fair reputation of doing business in our line, we expect, with the reasonable support of all naturally interested in the success of our enterprise, to make the coming volume superior to its predecessors, and eminently satisfactory to the Institute, to our patrons and to the general public, who are more or less benefited by such an advocate of the substantial advancement of the grand and worthy industries of our coast.

DEWEY & CO., Publishers.

Office, MINING AND SCIENTIFIC PRESS, No. 202 Sansome street, N. E. corner Pine, San Francisco.

ST. MATTHEW'S HALL.—The next term of school at St. Matthew's Hall, San Mateo, begins on the 22d inst., next Thursday, as will be seen by advertisement in another column. The last term of this well-known institution was the most successful in its history, and the prospects now are that the next will be even more so. Applications for admission are being daily received. During the vacation the buildings have been thoroughly overhauled, renovated and put in an attractive condition; some addition to the school-rooms have been made and other extensive improvements carried out, as demanded by experience and the increased requirements for such accommodations. All its departments are perfectly arranged, and boys committed to its charge will be certain that their moral and physical welfare will be as carefully looked after as their mental training.

AMERICAN plows and other agricultural implements are being shipped from Tucson into Sonora.

DEAD RIVERS OF CALIFORNIA.—It is estimated that among the dead rivers of California lying up 7,000 or 8,000 ft. above the sea, there lies a treasure of more than \$300,000,000, the annual product being uniformly about \$8,000,000. In one little spot in Nevada county there has been taken out about \$100,000,000. Some of these dead rivers have a fall of 50 ft. to the mile, affording good opportunities for drainage, under currents, and all the various modern appliances for saving fine gold.

QUARTZ MILL BURNED.—The Leopard Co.'s mill, at Milltown, two and one-half miles from Cornucopia, was burned to the ground about midnight, July 12th. The mill was shut down and a watchman was guarding it. The fire started in the upper part of the building, and was evidently the work of an incendiary. The mill was insured by the company's creditors for \$15,000.

Healthful Waters.

TO THE RURAL PRESS:—In my late trip through Lake county, among the many resorts for health or recreation that it was my good fortune to visit, none impressed me more favorably than Anderson's Springs, both for the valuable and varied medicinal qualities of its numerous springs and the beauty of its surroundings, together with its cool and agreeable climate, even in the sultry days of June, making it a favorite refuge to the many toilers of our cities, tired and sick of body or weary of mind, aside from the health-giving properties of its water. All who have given them a trial pronounce them unsurpassed in this State. It is most emphatically a place of rest, of quiet, luxurious repose amid cooling shades and sparkling waterfalls, enlivened by the song of birds and the perfume of flowers. The hotel is kept by Mrs. Anderson and her accomplished daughters, who preside with equal grace in kitchen and parlor, and whose genial influence imparts a home-like feeling that is immediately felt by all visitors. Few stop here any considerable time without hoping to return at some future opportunity.

For dropsy, nervous debility and rheumatism, as well as for liver and kidney complaints, the water and hot baths are remarkably efficacious.

Anderson Springs are located just off the Lakeport road, about five miles from Middletown. The hotel carriage meets the stage daily for the accommodation of travelers. J. STRATTON.

July 13, 1880.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

In the Whole History of Medicine

No preparation has ever performed such marvelous cures, or maintained so wide a reputation, as AYRES' CHERRY PECTORAL, which is recognized as the world's remedy for all diseases of the throat and lungs. Its long continued series of wonderful cures in all climates has made it universally known as a safe and reliable agent to employ. Against ordinary colds, which are the forerunners of more serious disorders, it acts speedily and surely, always relieving suffering, and often saving life. The protection it affords, by its timely use in the throat and chest disorders of children, makes it an invaluable remedy to be kept always on hand in every house. No person can afford to be without it, and those who have once used it never will. From their knowledge of its composition and effects, physicians use the CHERRY PECTORAL extensively in their practice, and Clergymen recommend it. It is absolutely certain in its remedial effects, and will always cure where cures are possible.

FOR SALE BY ALL DEALERS.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

THE BEST NEWSPAPER FILEHOLDER AND ADJUSTABLE DRAWER can now be had at this office. It consists of elastic fastenings, with stiff, cloth covered side. Size suitable for a full volume of this paper, \$1. To our subscribers 75 cts., mailed postpaid.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento valley. His advertisement appears from time to time in this paper.

FRESH attractions are constantly added to **Woodward's Gardens**, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

J. G. COLMERLIL is requested to report to this office from Humboldt Co.

EXTRA COPIES can usually be had of each issue of this paper, if ordered early. Price, 10 cents, postpaid.

Chew Jackson's Best Sweet Navy Tobacco.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Consolidated Virginia Mining Company,

Room 23, Nevada Block, No. 309 Montgomery St., S. F.

At a meeting of the Board of Trustees of the Consolidated Virginia Mining Company, held this seventh day of July, 1880, dividend (No. 52) of Fifty (50) Cents per share was declared payable on THURSDAY, the fifteenth day of July, 1880.

Transfer books closed until the 10th instant.

A. W. HAVENS,
Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, Room 37, S. F., July 15, 1880.

At a meeting of the Board of Directors of the above named Company held this day, Dividend (No. 50) of Fifty cents (50c.) per share was declared, payable on MONDAY, July 12, 1880, at the office in this city, or at the agency of The Nevada Bank of San Francisco in New York. WM. WILLIS, Secretary.

Office—Room 23, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,
San Francisco, July 2, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend (No. 17) of Seventy-Five cents (75c.) per share was declared, payable on MONDAY, July 12, 1880, at the office in this city, or at the agency of The Nevada Bank of San Francisco in New York. WM. WILLIS, Secretary.

Office—Room 23, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

POWDER CONSUMERS.

Please take notice, that in the action of the VULCAN POWDER CO., against a firm known as R. W. Warren & Co., of this city, composed of Robert W. Warren and Robert H. Yates, they and their employees and agents were enjoined from making, vending or offering to sell or manufacture an "VULCAN" BLASTING POWDER. VULCAN POWDER CO.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending this date, the Board of Directors of THE GERMAN SAVINGS AND LOAN SOCIETY has declared a dividend on Term Deposits at the rate of six (6) per cent. per annum; and on Ordinary Deposits at the rate of five (5) per cent. per annum, free from Federal Taxes, and payable on and after the 15th day of July, 1880. By order.

San Francisco, June 30, 1880. GEO. LETTE, Secretary.

Some fine sunny offices (next to the PRESS office), to rent (at very reasonable rates), by Dewey & Co., at 202 Sansome street, corner of Pine.

PACIFIC MACHINERY DEPOT.

H. P. GREGORY & CO.,

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Importers and Dealers in every description of

MACHINERY!

Sole Agents for the Pacific Coast for



BUCKEYE
Engine Company.

J. A. Fay & Co.'s Wood-Working Machinery; Bement & Sons' Machinists' Tools; Blake Steam Pumps; Knowles Steam Pumps; N. Y. Belting and Packing Co.'s Rubber Goods; Surtreant Blowers and Exhaust Fan; Tanite Co.'s Emery Wheels and Machinery; Payne's Vertical Engines and Boilers; Perry's Centrifugal Pump; Judson's Standard Governors; Dreyfus Self-Clutch; Gould Mfg. Co.'s Hand and Power Pumps; Ellipse Windmills; Disston & Sons Circular Saws; Otto Silent Gas Engine; Duca's Elevator Cups; Ballard's Oak Tanned Belting. Also on hand and for sale A FULL LINE OF MILL AND MINING SUPPLIES.

W. T. GARRATT'S

BRASS and BELL FOUNDRY
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MANUFACTURER AND IMPORTER OF

Church and Steamboat BELLS and GONGS
BRASS CASTINGS of all kinds,
WATER GATES, GAS GATES,
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Celebrated

STEAM PUMP

The Best and Most Durable in use. Also, a variety of other

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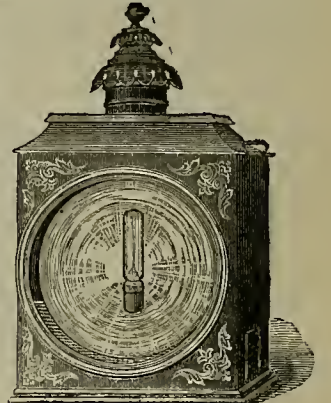
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AT LOWEST RATES.

Finck's Patent Silver-Plated Corrugated Glass Reflectors and Sun Lights for Lighting and Ventilating Churches, Halls, Stores, Etc.



BOESCH'S PATENT

Hydraulic Mining and Locomotive Head Lights, with the Latest Improvements, making them the best and cheapest in the market.

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Mining and Scientific Press Patent Agency.

THE MINING AND SCIENTIFIC PRESS PATENT AGENCY was established in 1860—the first west of the Rocky Mountains. It has kept step with the rapid march of mechanical improvements. The records in its archives, its constantly increasing library, the accumulation of information of special importance to our home inventors, and the experience of its proprietors in an extensive and long continued personal practice in patent business, affords them combined advantages greater than any other agents can possibly offer to Pacific Coast inventors. Circulars of advice free. Address, **DEWEY & CO.,** Office MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS, 202 Sansome Street, S. F.—1879.

SAN FRANCISCO, May 25, 1880.
Messrs. DEWEY & Co.—GENTLEMEN:—In acknowledging receipt of my two patents, I desire to express my thanks for the prompt attention which my business has received. The successful manner in which you have conducted the same shows a marked ability as Patent Agents, and I shall take pleasure in recommending your firm to all who desire to obtain patents. I have received copies of the MINING AND SCIENTIFIC PRESS containing descriptions of my inventions. With the best of wishes, I remain,
Yours truly, Louie Bronson.

Iron and Machine Works.

HOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS**and MACHINERY**

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PRACTICAL BOILER MAKER.

Marine, Stationary and Portable Boilers, Smoke Stacks
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possible terms.**UNION IRON WORKS,**

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Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery
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SACRAMENTO, CAL.**PHELPS****MANUFACTURING COMPANY,**

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle
Work, Car Frames and Bolts, Machine
Bolts, Set Screws and Tap Bolts,
Lag or Coach Screws.**ALL STYLES OF FANCY HEAD BOLTS.**
HOT AND COLD PRESSED HEXAGONAL AND
SQUARE NUTS, WASHERS, BOLT ENDS,
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Golden State & Miners Iron Works,Manufacture Iron Castings and Machinery
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All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
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boat Bells and Gongs of superior tone. All kinds of Cocks
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General Mechanical Engineer and Machinist.
Steam Engines, Flour, Quartz and Mining Machinery.
Sole manufacturer of Brodie's Patent Rock Crushers and
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The best ever invented; can be applied to any Engine
Piston and give entire satisfaction to those using. Steam,
Hydraulic and Sidewalk Elevators. Repairing promptly at-
tended to.**STEAM ENGINES AND BOILERS**Of all sizes—from 2 to 60-Horse power. Also, Quartz
Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron
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VERTICAL ENGINES,
HORIZONTAL ENGINES,
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TRY OUR MAKE, CHEAPEST AND BEST IN USE.

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IMPROVED PORTABLE HOISTING ENGINES,

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Steam Engines and all Kinds of Mill and Mining Machinery.

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Batteries for Dry or Wet Crushing, Amalgamating

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Act of Congress regulating the same, or for use on land. Water Pipe, Pump
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Boiler repairs promptly attended to and at very moderate rates.Pans, Settlers, Furnaces, Retorts, Concentrators, Ore
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Manufacturers of

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING, AND MINING MACHINERY
INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS,
CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES,
FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES,
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SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE
LATEST AND MOST IMPROVED CONSTRUCTION.Agents for the Allen Engine Governor, Bailey Air Compressor, Howell's
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HIGHEST PRICE PAID FOR SCRAP IRON.

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CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

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IN ALL ITS BRANCHES,

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Engines and Boilers,

HIGH PRESSURE OR COMPOUND.

STEAM VESSELS, of all kinds, built complete with
Hulls of Wood, Iron or Composite.ORDINARY ENGINES compounded when ad-
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to be employed. Speed, tonnage and draft of water
guaranteed.STEAM BOILERS. Particular attention given to
the quality of the material and workmanship, and none
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MACHINERY made after the most approved plans.
Also, all Boiler Iron Work connected therewith.WATER PIPE, of Boiler or Sheet Iron, of any size
made in suitable lengths for connecting together,
sheets rolled, punched, and packed for shipment ready
to be riveted on the ground.HYDRAULIC RIVETING. Boiler Work and
Water Pipe made by this establishment, riveted by
Hydraulic Riveting Machinery, that quality of work
being far superior to hand work.SHIP WORK. Ship and Steam Capstans, Steam
Winches, Air and Circulating Pumps, made after the
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Water Works purposes, built with the celebrated Davy
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J. W. QUICK, MANUFACTURER,

Several first premiums received
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SLOT PUNCHED SCREENS,
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Orders solicited and promptly attended to.
33 Fremont Street, San Francisco.**E. P. WHITE,**

SUCCESSOR TO

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PRINCIPAL OFFICE:

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Thirteenth street, bet. Howard and Folsom,

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All ordinary mending, sewing on buttons, etc., free of
charge. Orders left at the office will receiveprompt attention. Work called for and
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Steam Packing,

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GASKETS AND SPRINGS MADE TO ORDER
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New Book on the Comstock.

The attention of MINING ENGINEERS and EXPERTS
is called to the new work by JOHN A. CHURCH, E. M. Ph.
D., on "The Comstock Lode, Its Formation and History." This
very exhaustive treatise on this famous lode is fully
illustrated with diagrams and colored charts showing sec-
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manent value for reference. DEWEY & Co., Publishers of
the MINING AND SCIENTIFIC PRESS, are sole agents for the
sale of the work. Mr. E. M. STEARNS will act as their
agent, and call on Mining Engineers and those interested in
the great lode in this city with a copy of the book for their
inspection.

FRUE'S ORE CONCENTRATOR OR VANNER.
Plunger Jigs, Revolving Screens,
CRUSHING ROLLERS, SAMPLE GRINDERS.

FRASER & CHALMERS
MINING ENGINES, BOILERS, STAMP MILLS, FRUE VANNERS
(and Machinery) for Systematic Mining, Milling, Smelting and Concentration of Ores.
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Howell's Improved White Roasting Cylinders,
REVOLVING CYLINDERS AND ORE DRYERS.
Hoisting and Pumping Machinery.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

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HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretensions claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 XX is the Strongest Explosive Known.

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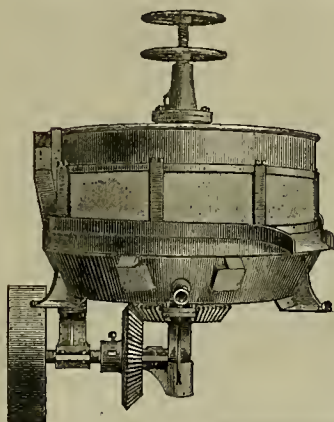
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ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

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STEIGER & KERR'S CONTINUOUS DISCHARGE AND GRINDING PAN.



This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it in the reach of all, and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is, is a most important improvement in the working of gold ore, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

In consequence of spurious imitations of

LEA AND PERRINS' SAUCE,

which are calculated to deceive the Public, Lea and Perrins have adopted A NEW LABEL, bearing their Signature thus,

Lea & Perrins

which is placed on every bottle of WORCESTERSHIRE SAUCE, and without which none is genuine.

Ask for LEA & PERRINS' Sauce, and see Name on Wrapper, Label, Bottle and Stopper. Wholesale and for Export by the Proprietors, Worcester; Crosse and Blackwell, London, &c., &c.; and by Grocers and Oilmen throughout the World.

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STEEL CASTINGS

FROM 1-4 TO 10,000 lbs. WEIGHT.

True to pattern, sound and solid, of unequalled strength, toughness and durability. An invaluable substitute for forgings or cast-iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammerheads, Crossheads for Locomotives, etc. 15,000 Crank Shafts and 10,000 Gear Wheels of this Steel now running prove its superiority over all other Steel Castings. CRANK SHAFTS, CROSSHEADS and GEARING, specialties. Circulars and Price Lists free. Address

CHESTER STEEL CASTINGS CO.

(Formerly McHaffie Direct Steel Castings Co.)
Works, CHESTER, Pa. 407 Liberty St., PHILADELPHIA

CHAS. E. KELLY,

Attorney-at-Law,

Notary Public and Commissioner of Deeds

209 Sansome St. Bet. California and Pine, S. F.

Connection in every town in the State for collection of debts.

LAKEPORT, Lake Co., Cal., Nov. 2d, 1878.
Messrs. Dewey & Co.—Gentlemen:—I hereby acknowledge receipt of patent, for which please accept my sincere thanks. When I have any further business in this line I shall certainly employ you. With kind regards, I am, Yours very truly,
CHAS. SEATREBEN.

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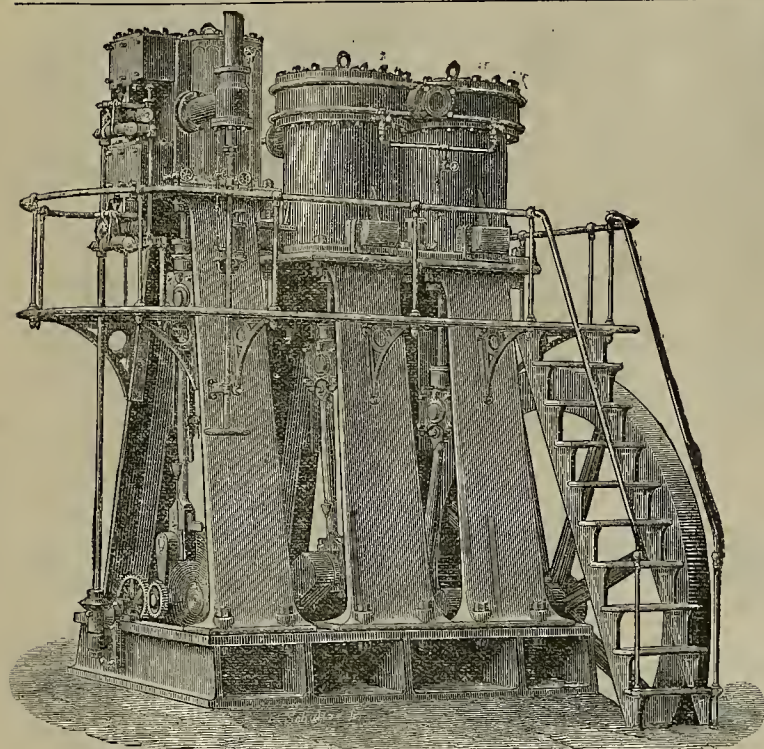
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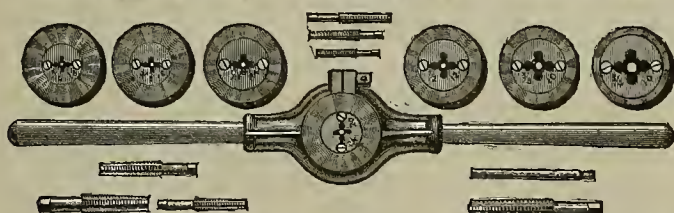
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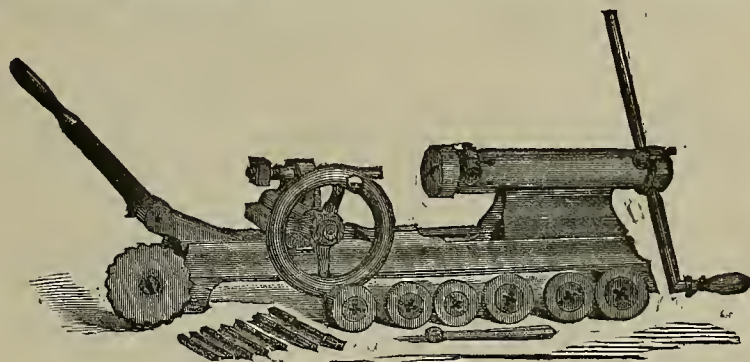
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JULY 24, 1880.

VOLUME XLII
Number 4.

Accidents on British and American Railroads.

The management of railroads in this country is generally believed to be so reckless, and the accidents on them resulting in death or injury are so frequent, that few persons would accept without hesitation the statement that for a given year, the accidents of this class in Great Britain were largely in excess of those in this country. Yet the record shows this to be the fact. Here are the relative figures from the *Railroad Gazette's* systematic record: Great Britain, for 1879, killed, 1,032; injured, 3,513; total, 4,545. United States, from May 1, 1879, to April 30, 1880, killed, 180; injured, 647; total, 827. In reviewing the tables of accidents for Great Britain in 1879, the *Iron Age* states that the British returns of accidents on railroads are more complete, and, therefore, more trustworthy than ours; nearly or quite every accident in the Kingdom appearing in the returns of the Board of Trade, while in the United States many accidents are not noticed at all. Until the reports shall be so rendered by our railroad companies as to embrace every accident, they will not afford trustworthy data on which to base a comparison between the United States and Great Britain on the score of accidents. There is a tendency on the part of American railroad companies to cover up accidents, from the apprehension that their publication would injure the line. This fact, and the denser population of Great Britain, may account in part for the difference in the number of accidents as above reported.

The *Iron Age* calls attention to another feature of the report of accidents on British railways for the year 1879; and, that is, the high percentage of accidents connected with the track, and their greater fatality. The following table, giving the total number of persons killed and injured in the United Kingdom for the year 1879, will show this:

Classification.	Killed.	Injured.
Passengers:		
By accidents to trains, rolling stock, permanent way, etc.	75	602
By accidents from other causes.	85	705
Servants of Companies or Contractors.		
By accidents to trains, rolling stock, permanent way, etc.	8	118
By accidents from other causes.	444	1,833
Persons passing over railways at level crossings.	64	30
Trespassers (including suicides).	308	137
Other persons not coming within above classifications.	48	88
Total.	1,032	3,513

Of the entire 1,032 killed, 308, or a little less than 30%, were trespassers on the line, while of the 3,513 injured, but 137, or less than 4%, were of this class. The only other case in this table in which the killed by any one class of accidents exceeds the injured is of persons passing over railways at level crossings—30 being injured and 64 killed. In another table the same is shown as to passing over lines at stations—24 being killed and 11 injured. In a table giving the oc-

cupations of the servants of the company killed and injured, the only occupation in which the number of killed and injured approach each other is among the permanent way men—103 being killed and 156 injured. This 103 is 33% of all the killed, while the 156 is a little over 10% of the injured.

These figures are full of instruction to our railroad companies, and ought to receive careful study and analysis. They indicate certainly the direction in which greater care should be exercised and more complete safe-guards used. The number killed of the servants of companies, who are designated "permanent way men," is something enormous—33% of the total number killed in the year. It would appear that such a remarkable result must arise either from the extra-hazardous occupation of the men, or from the low order of intelligence of the class from which they are recruited. In any view of it, a

Niles' Hoisting Engine.

Our engraving on this page illustrates one of Niles' double-reel geared hoists, and consists of a pair of 12 by 18 inob engines, link motion, style known as Corliss pattern, bolted at each end on cast-iron sole plates, extending from one engine to the other; crank shaft made from the best hammered iron and fitted with a heavy fly-wheel in the center. Two pinions, with clutches to the crank shaft, that bring the pinions into action whenever desired. The reel and spur gear are strongly bolted together. A very effective arrangement of brakes is secured by setting heavy wooden friction blocks in wrought-iron frames, which are carried below, fitted in sliding boxes resting on sole plates and

Placer County Mines.

The hydraulic mines around Dutch Flat all have an abundant supply of water and are doing well. The prospecting work going on in the vicinity is giving encouraging results, and several promising claims are being developed. The water supply of the hydraulic mines on the Forest Hill Divide is giving out. The Dardanelles is piping for a few hours daily with 2,000 inches. The other hydraulic mines are doing little or nothing. The Hidden Treasure, at Sunny South, and the Breese & Wheeler, at Bath are working with a full force of men. The latter is yielding net about \$15,000 monthly. All of the more prominent quartz mines in the county, with the exception of the St. Pat-

rick, at Ophir, which has temporarily ebbed down, are doing well.

At the Conrade mine on Duncan Hill, the shaft has been sunk to a depth of 100 ft. The ore at this depth is very good. The east drift on the 75-ft. level is in 55 ft. running in high grade ore. A whim has just been put up, and other permanent improvements made. Eighty-five tons of ore taken out in the shaft, and in opening the 75-ft. level has yielded \$4,100, an average of \$48 a ton.

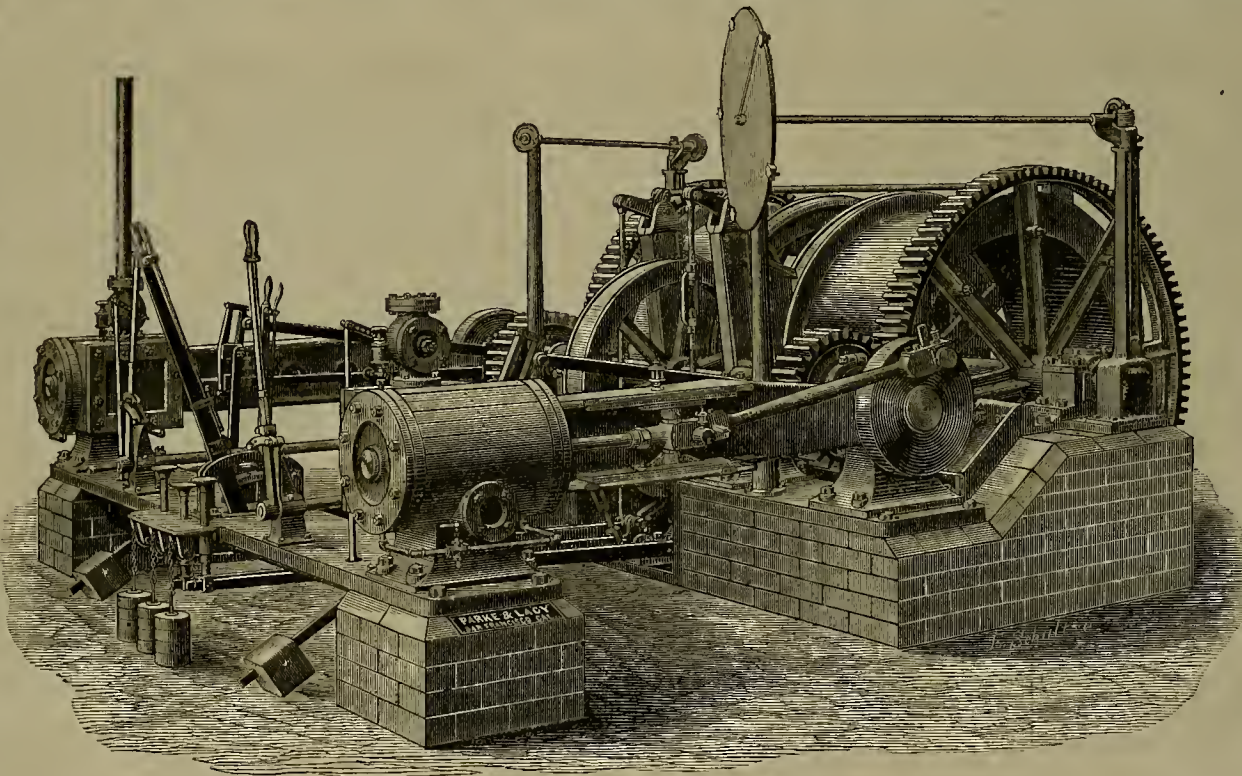
At the Shurtleff mine ore has been stopped out between the two shafts 40 ft. apart and 80 ft. deep, the vein averaging 24 inches in thickness. Thirty-six tons of this rock crushed yielded \$8,500, or an average of \$236 a ton. Fifty tons of equally rich ore are on the dump now. Mr. Shurtleff is having a whim erected, when the shaft will be deepened to about 200

ft. He also contemplates erecting a mill at an early date.

Operations at the Iron mine are being pushed forward rapidly. The furnace is fast being completed, and within 60 days it will probably be in blast. A reservoir of a capacity of 6,000,000 gallons is being constructed to supply the water needed for the hydraulic machinery and boilers.

A VALUABLE MINE.—The Victorine mine, lying in the mountains flanked on the west by Smoky valley, in eastern Nevada, which has been idle for many years, is likely to prove a very valuable mine. The correspondent of the *Eureka Sentinel* says that lately Mr. Edward S. Stokes, who owns the mine, sent into Austin a piece of Victorine ore weighing some 75 lbs.—a splendid mass of gold-bearing quartz—the assay value of which was \$960 in gold and \$67 in silver per ton. The owner has been exploring for the vein of the Victorine for several months, and has cut it at last while sinking a winze. Its dimensions have not yet been ascertained; but the vein is believed to be large, as the outcroppings, which were cut years ago, were remarkably bold. It now seems probable that the Victorine will redeem its original promise.

E. L. Bradley, formerly State Senator from Placer county, died in San Jose, July 17th, from the bite of a kitten.



NILES' DOUBLE-REEL GEARED HOISTING ENGINE.

permanent way man must be a "dreadful trade."

A WORD OF CAUTION.—A correspondent at Dutch Flat, Placer county, has written to us in relation to a description of the St. George gold gravel mine, published in the *Mining News*, of New York. He questions the accuracy of many of the statements in the publication, and directs attention to the omission of specific information as to the locality of the property, neither township, district, nor county being mentioned. He adds, also, that in his belief there has never been an official survey by the Government of the ancient river channels of California; and that the only work of that kind is a small diagram, published in 1877 by the U. S. Mining Commissioner. This diagram was compiled by C. J. Brown, of Dutch Flat, who gave permission for its publication; and our correspondent, who is evidently familiar with the subject, alleges that he did the field work, collated the material and originated the theory embraced in that diagram. But it was not official. At present we have no time to verify the facts at issue. We think it well, however, to advise those who may wish to invest in the mine specified, to first get at all the facts relating to it, which they may do by addressing Andrew Larson, Dutch Flat, Placer county, Cal.

connected with heavy wrought-iron rods on the top; they are applied both to fly and brake wheel, by the engineer, through suitable foot levers. Messrs. Parke & Lacy are prepared to furnish the following sizes at short notice: 8 by 12 inch engines, drums 48 by 28 inches, weight, 15,000 lbs.; 10 by 12 inch engines, drums 48 by 28 inches, weight, 18,000 lbs.; 12 by 18 inch engines, drums 66 by 30 inches, weight, 40,000 lbs. Address Parke & Lacy, Nos. 21 and 23 Fremont street, in this city, from whom all information can be obtained.

PASS OF THE CASCADES.—The party of engineers of the Northern Pacific railroad which went to examine the Natchess pass of the Cascade mountains, has reported that the summit was crossed about 40 miles southeast from Wilkeson at an altitude of about 4,800 ft. The ascent from the west side is easy until the backbone is reached near the summit, at which point a tunnel about one mile long will be required. The descent into Yakima valley is said to be much superior to the approach from the west. The report of the engineer in charge of the party, Mr. J. T. Sheets, is represented to be favorable beyond expectation. The condition of the pass, it is said, removes all apprehension of difficulty from snow; and the location is fortunate in other respects, as it secures a direct line on the eastern slope of the Cascades from Ainsworth to the Sound.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

El Dorado County Notes.

EDITORS PRESS:—Since writing you last I have visited many of the mines in El Dorado Co. At the Rosserans mine a 10-stamp mill is running day and night; the ore is prospecting well, and the ledge is of substantial width. The Taylor mine, owned by L. B. Mastick, Col. Nelson and other parties, of San Francisco, is not being worked, although the 10-stamp mill which was run successfully so long is still on the ground. The trouble with this mine is, that while it is for sale, the proprietors are injudiciously asking a fabulous price for it, unwilling to take what is reasonable. And right here I wish to say that this custom is much too prevalent in El Dorado Co. Owners of mines scare away capitalists who are looking for mines in California by demanding unreasonable prices for their property, under the impression that because these rich mines are located so conveniently, amid wood and water, and where the advantages of cheap transportation are available, and where cheap labor is so easily procured, that therefore capital cannot avoid investment here. The consequence is, capitalists do not so much as inquire into or investigate the quality or quantity of our rich ores, and the miner who has discovered and located valuable quartz ledges in El Dorado Co., and who could, if he were judicious, be independent in a day, remains a poor man, and sits at ease, "waiting for something to turn up."

There is another unfavorable feature of the case which has repeatedly come under my observation here. Owners of mines which are for sale are in the habit of giving every other mine in the neighborhood but their own a "black eye," as the term goes. I have myself visited mines which are known to yield well and to be good property, and have afterwards inquired of owners of neighboring mines as to the value or prospect of such mines, with the pretended view of purchasing, and I was certain to hear nothing but disfavor concerning them. No mine in the neighborhood was good but their own. It is easily seen how disastrously this must work to the interests of all; for as soon as the "grand round" of the working mines and prospected ledges is made by would-be purchasers, the reputation of the entire region is seriously injured, if not ruined. The cause of this, probably, is, that almost all mines are for sale, because the owners are comparatively poor, and stand in urgent need of coin. But while they are anxious to sell their mines, they are doing just what is calculated to retard their sale. I have written thus in the hope that the mine-owners of El Dorado Co. may know how the case is viewed by a disinterested looker-on, and may improve by the suggestions implied in these statements.

At Spanish Dry Diggings Mr. Lewis Sites has tumbled upon exceedingly rich prospects. From a decomposed porphyritic rock he is panning out all the way from 25 cents to \$75 the pan. It is called the Modoc mine, and seems, so far as present appearances go, to be exhaustless. It adjoins the well-known Pennsylvania mine on the east. We are pleased to learn of this rich "strike" of Mr. Sites, for he is one of El Dorado county's very best and most worthy men.

The "Golden State" mine, three miles from the above, is also yielding well, as are also several "diggings" in Onion valley, owned by Messrs. Chessrown and Edwards.

The Lady Emma, at Kelsey, is about to be reopened, and the company will soon erect a mill on it.

At Placerville are located many rich mines, as the reader is aware—among them the Pacific, near town, where a 20-stamp mill is in perpetual motion, crushing rock which pays \$10 to the ton, and the Gross mine, where immensely rich rock has been struck. A drift is being run in the Gross mine to ascertain the extent of the deposit. In Coon Hollow the Weber mine has reached the shaft in the old mine, and prospecting has begun in earnest. A citizen of Placerville, named Pierre Vignaut, owns a ledge near the Gross mine, on which he has cross-cut 13 ft., showing gold all the way.

During my stay in Georgetown I had the pleasure of meeting Mr. Thos. Findley, managing director of the California water and mining company. Through the courtesy of this gentleman I was invited to visit the Nagler mine at Greenwood, the property of this company. This is probably the richest mine in the State. It is hydraulized to a depth of from 40 to 70 ft., and averaging 500 ft. in width. Several millions of dollars have been taken out of this mine by former owners. The rock is serpentine and talcose slate, greatly decomposed. A shaft of 150 ft. has been sunk, the lode widening as the shaft descends. Two hundred thousand tons of rock lie on the dump ready for crushing as soon as the 30-stamp mill, which the company is erecting, can be put in operation.

In my next I will speak of other mines I have visited in this section. A. J. B.
Placerville, Cal., July 8, 1880.

Silver Mines in Eastern Nevada.

An Account of the Famous Alexander Mine, Grantsville, Nye County.

Mr. Samuel T. Curtis, Superintendent of the Justice Co., having recently made a visit of observation to Grantsville, has given the following interesting account of its principal mines, and of the mining facilities of the district, to the *Territorial Enterprise*:

Grantsville

Is a very promising mining camp of about 700 people. It is 70 miles south of Austin, the present terminus of the Central Nevada narrow-gauge railroad. The town is situated on a flat immediately southeast of the canyon, on the sides of which are the Alexander, Brooklyn, Alameda and other mines. Great activity is now being shown in building. Wood is cheap—\$3.50 per cord, for nut pine—and clear, cold water is obtained by sinking wells about 60 ft.

The Alexander Mine.

The main source of support to the town is the Alexander mine, which, in my opinion, is going to be, in a very short time, one of the greatest bullion-producing mines on the coast, if not the greatest. This mine has now in sight one of the largest bodies of ore it has ever been my lot to see, millions of tons of ore in reserves being exposed by numerous tunnels, open cuts and winzes. The mine lays on the north side of the canyon, and five tunnels or openings have been made, disclosing ore bodies of great magnitudes. In one open cut, where the ledges crops to the surface, the ore is being quarried about 25 ft. deep, and looks as if the body was inexhaustible.

The upper ores are chloride, and the character of the ore changes to sulphurets in depth. No. 5 tunnel is on a level with the bed of the canyon; the level is only partially exposed yet. One body on this level has been cut into over 80 ft. of solid sulphuretted ore, and another very fine body of chloride and sulphuretted ore mixed has been penetrated a considerable distance. From small tunnels, shafts and other openings it is shown to a certainty the ore body extends to the extreme ends of the claim and to the croppings on the apex of the hill. No. 6 level is opened by incline shaft, and is over 70 ft. below the level of the ravine and water level; shows very fine sulphuretted ore. Work has only been commenced on this level, and crosscuts have not reached far enough to cut the ore bodies of the level above, but enough is now seen to prove that it will be a great level. In all the openings in the mine from the surface down there are immense reserves, the work in the mine being carried on by small stopes at great distances apart in the large ore bodies, and as the rock stands well, sufficient ore is obtained in this manner, with little timbering, to keep the mill running.

The mill has 20 stamps, crushing dry and using White & Howell's roasters. A well sunk inside the mill supplies the water, and this well, although a considerable distance south from the present workings, has penetrated the ledge on its dip, the bottom being in good sulphuretted ore. The rock is not very high grade, but wood is cheap (\$3.50 per cord at the mill), and facilities for mining are so good that the low cost of extraction and reduction make an equivalent.

Yard-Stick Superintendents.

This mine gives another example of the sagacity of Eastern yard-stick Superintendents. The property once belonged to an Eastern company, and under such direction the first act was to build an expensive mill in the valley about 10 miles from the mine. A little ore was worked and failed to pay. A long tunnel was run and found nothing, for the simple reason that it was run parallel with the ledge. The mill was torn down and removed to White Pine during the excitement at that place.

The mining ground lay abandoned for years, until it was relocated and finally came into the hands of the present managers. Supt. San Pedro ran a crosscut from the long tunnel run by the Eastern folks, and in a few feet struck ore. Two mills were immediately furnished, and rock averaging about \$70 was found. Some time afterwards a company mill was erected of 20 stamps, and bullion has been flowing steadily since, the last month's product being about \$45,000. Twenty stamps more are being added to the mill at present, which will increase the yield two fold, with very little increase of expenditure.

Other Good Mines.

There are several very fine prospects in the camp outside the Alexander. The Brooklyn, Alameda, Lloyd and Mollie Brinton are in shape to pay. The Brooklyn shows a large body of ore, \$37,000 being produced from this mine last month, the ore worked averaging something over \$70 per ton. The McMahon, belonging to a Chicago company, has struck a good body of ore in their shaft. The Natchez, Galatea, Chicago, Oriental, Cadiz, Brooklyn No. 2, Potosi, Leffer tunnel and the Triumph Con. company are all promising properties, and prospecting is so active in camp at present that new discoveries may be made shortly.

The San Pedro District.

About 20 miles northwest of Grantsville, contains many large ledges and an abundance of wood and plenty of water for milling purposes.

The Belle District.

About 40 miles west, contains some very fine ledges, but wood, with the exception of cedar, is scarce.

Ellsworth District.

About 17 miles further on, shows very many

fine ledges, most of them large and, as far as developed, producing rich ore. Wood is very plentiful and water easily obtained. Here again is another Eastern mill rattling down in charge of a keeper.

In the valley near Ione is still another mill built by Eastern folks for the Ione property on the site of the old mill erected for the Alexander mine years ago. This mill is idle and afflicted with the same troubles as all its Eastern brethren in this section, past and present.

A Contribution to Californian Geology.

Paper read before the California State Geological Society by Melville Attwood.

Mr. I. Beetes Jukes, in his very useful and truly practical "Students' Manual of Geology"—which ought to be read by all engaged in mining—says, in his introduction to the subject:

In order to reduce the great subject of geology to something like order, it appears advisable to divide it into three heads, for which we use the terms of, 1. Geognosy; 2. Paleontology; 3. The history of the formation of the series of stratified rocks. By geognosy, I would understand, then, the study of the structure of rocks, independently of their arrangement, into a chronological series, and I would divide it into two parts—lithology (stone lore) and petrology (rock lore). By lithology, I would mean the study of the internal structure, the mineralogical composition, the texture and other characters of rocks, such as could be determined in the closest by the aid of hand specimens.

Under petrology, I would arrange the larger characteristics of rocks, the study of rock masses, their planes of division, their forms, their positions and mutual relations, and other characters that can only be studied in "the field," but without entering on the question of the geological time of their production.

Under the head of paleontology, I should wish to give the heads of several great questions as to the laws which have governed the distribution of life, both in space and in time, as also to indicate some of the chief points in the structure of the more important extinct races and their relations to those now living.

"Jointed Structure."

All rocks, eruptive, sedimentary and metamorphic, are traversed by numerous planes of division termed "joints," obviously the natural result of the shrinkage or contraction of the rock masses during consolidation.

In studying the stratified rock it will be seen that, besides the planes of division, the result of succession in the acts of deposition, and which form separate strata or beds, there are other planes of division ("joints") which intersect the beds at various angles. It is not uncommon for these joints to change their angle in passing from one bed or stratum to another. Joints are mostly regular and close in proportion to the compactness of the texture of the rock; in sandstones they are uneven and often open.

In volcanic rocks the joints have been, in many cases, widened by the action of water percolating through them and dissolving a portion of the rock. Little or no attention appears to have been paid to the jointed structure of the enclosing rocks of the Comstock lode; the general direction or course the planes of jointing in Comstock rocks are nearly the same as that of the lode, and their dip and the underlay of the lode and ore bodies have a corresponding angle of inclination. A careful examination of the jointing of the rock east of the lode would enable a petrologist to distinguish the dykes from the sheet rock. The prismatic joints, like those in the basalt at the Giants' Causeway, which often resemble dry starch in their irregular and wrinkled sides, are too well known to say anything about them. The joints in granite enable the quarryman to carry on his work with success; indeed, the whole art of quarrying consists in taking advantage of the natural divisions of the rocks by joints.

I have made a careful examination of the "jointed structure" from the Aurora Tunnel to Bodie Bluff, and found that in that section the joints, or rents, form planes of separation which are often slightly open and from a few inches to many feet apart. They traverse the rocks in straight and well-determined lines, which have definite compass bearings. They appear to be of three kinds—"vertical joints," "dip joints" and "diagonal joints." The crevice veins filling portions of these joints, or rents, are mostly of a limited extent and depth, though sometimes rich in gold.

On Bodie Bluff the croppings of many veins of this character may be seen; they are similar to what are termed "gash veins," being wedge-shaped and terminating at no inconsiderable depth. Others, however, are very different, though of the same class, like many of those met with to the south of the Standard mine, which are rich in gold, but do not appear to have any croppings, and have been discovered by crosscutting at some depth below the surface of the ground, filling portions of the dip joints and following them down till intersected by diagonal joints, and running along the diagonal ones into other dip joints.

A similar class of auriferous veins has been met with in Australia. Mr. Daintree, F. G. S., says, in a paper which he read before the London Geological Society, in 1878, "On certain modes of occurrence of gold in Australia." Below the zone of decomposition, however, we generally lose a class of auriferous veins which have proved very misleading to the miner, though usually very rich in gold. These usually

follow the line of jointings in the rock, and are, in my opinion, simply due to the decomposition of this auriferous pyrites and of the country rock, and the redeposit of such of the decomposed material as passed into chemical solution in local fissures. The Bodie rocks are of the same class as those met with to the east of the Comstock, and overlying that lode, the greater proportion of which may be called "fracture dikes," in all their different stages of alteration and decomposition—diorite being employed for the old term greenstone. Mr. Rutley, in his valuable little work on "The Study of Rocks," says: "The term 'greenstone,' which, in its older signification, embraced basalt, diabass, gabbro, diorite, etc., has subsequently been restricted in its application, and employed as a synonym for diorite. Since, however, the name greenstone is almost meaningless, it seems desirable either to discard it, or, still better, to use it in its original sense as an ambiguous and comprehensive term, useful in field geology, but otherwise only admissible as an expression of comparative ignorance, such as may safely be employed in the case of rocks of a certain type, which have reached so advanced a stage of decomposition, and in which the constituent minerals are so poorly developed, that it is no longer safe or possible to hazard any opinion concerning their precise normal mineralogical constitution." The rocks collected during the sinking of the new Yellow Jacket shaft—now, I believe, some 3,000 ft. deep—will, when properly determined, throw more light on the geology of the Comstock than any work that has yet been undertaken.

The difference between the Comstock lode and the lodes of Bodie—I mean those of the Bodie lodes which occupy portions of fissures which have dislocated and displaced the jointed structure—is that the country east of the Comstock lode forming the hanging wall, consists entirely of acid rocks (rocks containing a large proportion of silica), while the west country's footwall rocks are what are called basic rocks—andesite, dolerite and Mount Davidson diorite—all of which contain but a small percentage of silica.

The branch fissures, however, which yielded such immensely rich ore bodies, have jointed structure to the east and west of them, and are enclosed in acid rocks, so that it is comparatively easy to distinguish between them and the main lode.

The Bodie lodes, so far as I have examined them, have acid rocks for their foot and hanging walls; in fact, are enclosed in them.

The most reasonable solution for the hot water encountered in the deep workings of the Comstock, is that of "expiring volcanic action," and the high temperature of the east country rocks, or those overlying the lode, I think is caused by the heated vapors rising from the main fissure through the planes of the jointed structure and numerous branch fissures, the west country rocks being comparatively cool.

Hot springs are nearly always found in the neighborhood of extinct and active volcanoes. "We learn from Bunsen's experiments on the great geyser in Iceland, that at the depth of only 74 ft., at the bottom of the tube, a column of water may be in a state of rest, and yet possess a heat of 120° centigrade, or 248° Fahr." Those who can remember the Steamboat springs in Nevada and the Geysers in Lake county 20 years ago, can realize how rapidly the volcanic action is subsiding.

In M. Truher and Margolli's book on "Volcanoes," the Steamboat springs are described as follows: "We have already described the intermittent springs of Iceland—the Geysers—similar springs have been discovered in California, on the eastern slope of the chain of Sierra Nevada, not far from the Lake of Washoe. The water rises in jets to a height of seven yards; the jets follow each other at intervals of five minutes, and produce a noise which resembles thunder."

The temperature of the hot water met with in the Clifford amalgamated mines, Cornwall, closely corresponds with that of the Comstock. (See report, 1864, of Prof. W. W. Smyth, Chief Inspector of Coronado mines.) At a depth of 1,350 ft. below the adit, or 1,650 ft. from the surface, the water issued at a temperature of 122°. The enclosing rocks of the Wheel Clifford lodes are clay, slate and quartz porphyry, both of compact texture.

RECKLESS BRIDGE BUILDING.—Many railroad companies in building wooden bridges take no pains to get iron rods which are suitable for such work, but purchase what is easiest to be had in the market, and in many cases never find that the iron was bad until a bridge tumbles down. There are without the slightest question, hundreds of bridges now in use in this country, which as far as mere proportions and dimensions go would appear to be entirely safe, but which on account of the quality of the iron with which they are made are entirely unsafe; and there always will be as long as railway presidents, superintendents or roadmasters buy iron which they know nothing about, to put into bridges.

EXPLORING BOYS.—Colorado Springs has a "Boys Exploring Association," organized and conducted by Rev. R. T. Cross, of the Congregational church. "The object of this association is to carry on explorations in the vicinity of Colorado Springs, and to secure physical, mental and moral improvement." On the first trip, two of the boys discovered in Williams canyon what is declared to be the finest cave in the State. It is not yet fully explored, but has many chambers, and wonderful stalactites.

MECHANICAL PROGRESS.

American vs. English Railroad Engineering.

R. M. Brereton, engineer-in-chief of the Great India Peninsular railway, writes from England to W. W. Evans, of New York, as follows: During the past 26 years I have spent 14 years in India in the construction and working of one of the principal guaranteed railways, besides four years in England, and nearly eight in the United States, so that I am able to compare the working results in each country from the standpoint of experience. I have come to the conclusion that we can and ought to construct, equip and work our railway system in India, in our several colonies and in this country, too, in a far more economical manner than past experience here has shown to be possible, or our consulting engineers, managing directors and agents (who have not had the opportunity of studying the working of the 77,470 miles of railway of the United States) have hitherto believed to be possible.

In regard to locomotives, the Americans certainly obtain from 8,000 to 10,000 train miles greater duty per annum than we can in this country or in India, and this, too, under the following drawbacks: Inferior road-beds, steeper gradients, sharper curves, more severe climate, heavier loads hauled and less speed in running. The greater duty obtained cannot be due to better workmanship and superior materials, because it is well known that the English mechanic in skill of hand cannot be excelled, and the very best materials are employed by our English builders, and the hours of work in both countries are nearly the same. Hence, I argue that the greater duty done by the American motor is due to the better design and the better system of working the locomotives. The American builder excels in the system of framing and counterbalancing, and in the designs of the crank, axles, etc., so that the engine may run remarkably easy and without jar around sharp curves, and work not only on the light roads, but also diminish the wear and tear on the solid roads, and at the same time increase the effective tractive force. The English engine is a very heavy affair, and, in running, it not only wears and tears itself very rapidly, but also the roadway, and it greatly, by its unsteadiness and jar, fatigues the drivers and firemen.

NOVELTY IN WIRE ROPE.—A method is being employed by Messrs. Cradock & Co., of Wakefield, of manufacturing wire rope, which they thus explain: "By the old or ordinary mode of construction of wire ropes, the wires are worn on the crown of the strands, whereby friction is confined to a very small portion of the wire only; the wires in a rope are almost in a straight line with the rope, and as they retain their full size and strength on each side of the worn or weakened part, the working of the rope around drums, pulleys and curves causes the bending to take place on the worn or weakened part especially; hence, the reason why so many ropes have to be thrown aside as useless, through breaking of wires when but slightly worn." They further state that by their improvement in the construction of round and flat ropes, they have a much longer surface of the wire exposed to friction, and, less, if not entirely remove the cause of wires breaking on the crown of the strands. As the working of the rope around drums, pulleys and curved heads the wires in an oblique direction, they thereby secure the greatest amount of wear from the wire that is possible, as the wires will not break until they become too much reduced in strength, and therefore too weak for their work. The wires in the strands, on this principle, it is asserted, have a very much longer hearing one against another than in the ordinary system, and they are thereby enabled to prevent the great injury resulting from the wires in each adjoining strand cutting into each other. They therefore claim for this new rope a greater durability than can be obtained by any other construction. We are sure that colliery proprietors and others using such appliances will give due consideration to the claims put forth by the manufacturers.

CHERRY HEAT WELDING COMPOUND.—This compound is comparatively a new thing, and is designed to supersede borax for welding purposes, and is said to be not only superior to borax, but valuable for many purposes for which borax is useless. Less heat is required in welding for this compound, and, consequently, a considerable saving in time and coal attends its use, enough, the manufacturers of the compound say, to more than cover its cost in many cases. It is also said to be a perfect protection to steel from any degree of heat obtainable in a smith's forge, and by its aid many forgings of steel can be made at one heat, which, without it, would require three or more heats. It is claimed also to possess the quality of restoring "burnt" steel perfectly.

ADVANTAGE OF METALLIC LUBRICANTS.—In a drying machine it was found impossible, even with the greatest care, to keep the rollers clean, so as to prevent the injury of the goods by grease-spots from the lubricating oil. The difficulty was entirely obviated by the use of metailine as a lubricant.—*Chron. Ind.*

Steel Wire.

During the progress of making the cables of the East river bridge, N. Y., and the testing in connection with this work, some interesting experience has been gained as to the strength and characteristics of high class steel wire. According to some data recently communicated by Mr. F. Collingwood to the American Society of Civil Engineers, there can now be had in quantity steel wire having a tensile strain of 160,000 lbs. per square inch, and giving before breaking an elongation of 23% in 100 ft. lengths, or an elongation of 4% when tested in one ft. lengths. Steel of the same quality as that in the above-named wire, when made into bars of the ordinary sizes used in bridge building, has been found to have a tensile strength of 70,000 lbs. to 75,000 lbs. per square inch, with an elastic limit of 40,000 lbs. per square inch, and an elongation of 15% in samples one ft. long. As regards the wire, the experience at the East river bridge has shown that with steel wire drawn and coiled in the ordinary way, no satisfactory determination of the elastic limit or of the elongation before fracture can be made, on account of the set induced by coiling. This inconvenience can, however, be avoided by leading the wire straight from the galvanizing-trough to such a distance that it becomes cool before it is coiled, at the same time taking care that the coils are not too small. In the case of the East river bridge for wire of No. 7 and No. 8 B. W. G., the diameter of coils used is four ft. six in., and wire so coiled will lay out straight when loosened from the coil. Mr. Collingwood states that galvanizing has been found to increase the strength of freshly drawn wire about 15%, while ungalvanized wire has been found to gain nearly 5% in strength by being simply allowed to rest for a week or two after drawing. The increase of strength in both these cases appears to be due to some adjustment of the strains set up during the drawing process. Galvanized wire has also been found to increase slightly in strength by being allowed to rest.

CORRUGATED BOILER FLUES.—According to Engineering corrugated boiler flues are rapidly coming into favor in England. More than 200 have been delivered by the makers this year, and about 150 are at present in course of construction. By repeated tests it has been shown that these flues are much stronger to resist collapse than ordinary flues of the same size and weight of metal, and it is claimed that they have enabled marine boilers to produce considerably more steam. The fact of their great advantage has been arrived at chiefly by comparing the performance of nearly similar vessels with and without corrugated flues. The former either attain higher speeds or use less fuel, the difference being very marked. Not less important than this radical improvement in boiler construction, is the fact that they have been successfully made out of steel plates, welded by a special machine. The plates are of Siemens-Martin steel, and some are as large as 15 ft. long by 8 ft. 9 inches wide. This welding of these plates into tubes is certainly a noteworthy event in the manipulating of steel. The Leeds forges company, however, are about to construct machinery for rolling solid steel tubes without weld, 4 ft. 9 inches in diameter by 9 ft. long, from seamless circular blooms, under Mr. S. Fox's patents. When a weldless and seamless steel tube of these dimensions can be made, it would seem as if the very perfection of tubemaking had been reached.

THE WEAR OF STEEL RAILS.—The first engineer of the Rhenish railway, which has the longest experience in steel rails, has made a calculation, according to which the average duration of steel rails, where 24 trains pass over them every day, is 30 years, while that of iron rails, with a traffic of 17 trains, is 11 years. Steel rails, according to this calculation, last four times as long as iron rails, although they are but one-third more expensive. According to other experiments made in Germany, it is calculated that the mean duration of rails of Bessemer steel is about 16 years. On the other hand, it appears that 10 years of trial between Boulogne and Minden have shown that the renewals were, during that period, 70.7% for fine grain iron rails, 65.3% for cement steel, 33.3% for puddled steel, and only 3.4% for Bessemer steel, indicating that the latter class of rails would last longer than 16 years. There are, however, some faults to be found with this rail. The engineers of the Kaiser Ferdinand Northern line state that Bessemer steel is less capable of resisting concussion, and that, when sudden friction has caused heating of the rails, with rapid cooling from snow, injurious molecular changes are apt to occur.

WELDING TUBES AND TIRES.—Krupp, the great steel worker of Germany, has recently patented a new method of welding tubes and tires. He draws the tube over one pair of ordinary rolls, and then heats the whole length of the portion to be welded by a special contrivance, which is a portable fire-box, into which air is so blown that the heat is directed against the weld. After the necessary heat is attained, the rolls are set in motion, and the place to be welded is repeatedly drawn through them.

SCIENTIFIC PROGRESS.

The Microscope in Geology.

In no department of natural science has the student heretofore been compelled to tread with more uncertain step than in that of lithology. The interpretation of general geological phenomena has been quite satisfactorily given by Lyell; while the significance of organic remains in the sedimentary rocks has been quite as clearly unfolded by Buffon. But it is only recently that the geologist has been able to study the mineral constituents and minute structures of rocks, so as to decide with any degree of certainty in regard to rock genesis, or rock formation. In past times, if we gave a geologist a piece of rock for examination, he would tell us it was quartz, or granite, or trap, as the case might be. He might, perhaps, tell us it contained some kind of metallic substance, and with the aid of the crucible he would be able to tell us how much of the various metals it contained. But ask him about its mineral structure, how it was built up, the forms, nature and relative condition of its component parts, and he could tell us little or nothing. Through this ignorance of the building up of rocks, great confusion has existed in regard to the whole subject of petrology, and rocks of widely different natures have often been classed by our most learned geologists under the same name. Various methods of investigation had been employed to reach more accurate determinations. The microscope had been brought into requisition in the ordinary way of its use. Chemistry had been invoked, and its searching analysis employed to unveil the secret workings of nature in building up the stony foundations of the earth, but all with little success; and the geologist had about concluded that any further progress in this special department was at an end. Just at this time, Mr. Henry Clifton Sorby, an English geologist, resolved to apply the microscope in a new direction. He took thin scales of various rocks, ground them down into exceedingly thin plates, carefully polished these plates, or sections, on both sides, and mounted them on glass slides for examination, by either transmitted or by polarized light, with the view of determining how much they would thus be able to tell of their own history. He worked patiently for a long time in this direction before he reached any satisfactory results, and it is now only some 10 or 12 years since he was enabled to announce to the world that what the spectrum had done in revealing the composition and condition of the distant stars, the microscope, in his hands, was doing for the rocks and sands under our feet. A new and wide field of research was at once opened up, and great numbers of earnest students availed themselves of the opportunity, until now we are able to study not only the intimate structure of coarse or distinctly crystalline rocks, but also to investigate, with the utmost exactness, even the almost infinitely small crystalline structures, determine the form, nature and position of their granules, study at our leisure the minutest details of their structure, and thus reach most accurate conclusions in regard to their genesis. The microscope is thus becoming not only a great aid, but an indispensable requisite, to the study of geology. It has already thrown a flood of light on a class of rocks that have hitherto been most obscure; it has introduced a system where before all was vague and indefinite—in fact, it has quite revolutionized that branch of geology to which this new mode of study has been applied. By this mode of examination, the observer is often astonished to find that a piece of rock, which to the naked eye, or even when examined in bulk by a powerful glass, seems perfectly uniform—of one color and one type—really contains three, four, and perhaps five or more types. By the study of sections, prepared as above, the mining expert is now far better able than ever before to trace the continuity of either vein or wall rock, and note with certainty the minutest change in the rock through which he is working.—*Science Department in California for August.*

THE LONGEST GEODETIC ARC.—By the joint labors of Spanish and French engineers, under the direction of Ibanez and Perrier, science possesses the measurement of the meridional arc of 27°, the longest that has yet been measured on the earth and projected astronomically in the heavens. Biot and Arago, on their return from Spain, anticipated the possibility of such an undertaking, if the revival of Spanish civilization should ever open the way, and their dream has been realized, after 10 years' work, in an arc which extends from the northernmost of the Shetland isles, in latitude 61°, to the Saharan desert, in latitude 34°, covering nearly one-third of a quadrant.—*Comptes Rendus.*

NEWLY-DISCOVERED NERVOUS ENERGY.—During the past year, Dr. Brown-Sequard has often noticed that the irritation produced by a transverse section of the base of the brain produces opposite effects upon the nerves which are before and behind the section. Following the lead of these indications, he finds that some parts of the nervous system are able, when irritated, to produce a sudden notable augmentation of the properties, or of the motion or sensitive activities, of other parts of the system.—*Comptes Rendus.*

RELATION OF SPECTRAL RAYS TO THE CONSTITUTION OF NEBULÆ.—Ch. Fievey has made the spectral rays of hydrogen and of nitrogen the subject of a special careful investigation. By attaching to the spectroscopic a contrivance which enables him to regulate at will the quantity of light received, he observed that the spectrum of hydrogen was modified and simplified in proportion as the brilliancy diminished. The H line first disappeared, then C, and finally only F was left. It is well to remember that the F line is the only one of the hydrogen lines which has been observed, in a large number of nebulae that have been examined by the spectroscopic. The spectrum of nitrogen gave results similar to that of hydrogen. It is, therefore, not strange that we should meet, in nebular spectra, only the rays which are most persistent in diminished light. Such rays may suffice to establish the presence of the body to which they belong, and the disappearance of the others may be explained by their extinction in traversing the intervening spaces.—*Bull. de l'Acad. Belgique.*

COAL IN INDIA.—Theodore W. H. Hughes begins a paper on the coal fields of India by saying: "It will doubtless surprise many to learn that both in the superficial extent of its coal measures and associated rocks, and in the actual amount of its coal, India is surpassed by few countries, and that with respect to the size of some of the seams it stands pre-eminent in the history of mining." Even the U. S. cannot boast of seams 100 ft., 120 ft. and 160 ft. thick, like some that occur in Bengal. He calculates that the coal fields of India cover 35,000 square miles, and, according to estimates drawn up by Dr. Oldman, there cannot be less than 20,000,000,000 tons of coal in the empire. Much of the material, however, is of an inferior quality and fit only for very rough use.—*L'Ingen. Univ.*

PHOSPHORESCENCE OF THE GLOW-WORM.—WHAT IT IS.—Joussot de Bellesme has repeated the experiments of Matteucci upon the glow-worm with some precautions which lead him to more satisfactory results. He removed the cephalic ganglia so as to destroy all voluntary phosphorescence, and substituted the passage of a moderate electric current through the body, or in the luminous organ, thus producing a brilliant phosphorescence. When the insect thus prepared was plunged into carbonic acid, or into either of the inert gases, nitrogen and hydrogen, the electric excitement produced no light. His investigations lead him to regard phosphorescence as a general property of protoplasm, consisting in a disengagement of phosphureted hydrogen.—*Comptes Rendus.*

AMERICAN LAUREATES OF THE FRENCH ACADEMY.—At the last public annual session of the French Academy the Lalande prize was awarded to Prof. C. F. H. Peters, of Clinton, N. Y., for his planetary discoveries. The total number of asteroids discovered by him is 43, eight of which were added to the list during the past year. At the same sitting the Valz prize was awarded to M. Trouvelot, of Cambridge, Mass., whose magnificent drawings of the planets Mars, Jupiter and Saturn represent the telescopic appearances with remarkable accuracy, and furnish an excellent basis for the minute study of the superficial phenomena of these planets.—*Comptes Rendus.*

THE INDESTRUCTIBILITY OF MATTER.—This is capable of ready demonstration by preparing a couple of glass tubes of equal weight, each being filled with pure oxygen, and containing a few particles of carbon, free from appreciable amount of ash; that prepared from the fine loaf sugar gives very good results. The tubes are of precisely equal weight, and are hermetically sealed. By heating one of them the charcoal is caused to burn, and ultimately to disappear; the tube and contents, however, is of course found still to balance the other tube (which has not been heated), being of precisely the same weight as it was at first.

INFLUENCE OF CAPILLARITY UPON DYEING.—Gustav Engel has conducted an interesting series of experiments upon animal and vegetable substances, with a view to ascertain the principles involved in dyeing. Microscopical examination of infusorial earth showed that the coloring matter was attached solely to the interior capillary tubes. The experiments all agreed in proving that the facility of absorbing and retaining dyes depends almost entirely upon physical structure and especially on capillarity.—*Bull. de la Soc. de Mulhouse.*

NEW THEORY OF THE FORMATION OF HAIL.—Colladon supposes that the heavy rains and the hail-storms which follow them produce, by the very effect of their fall, a vertical wind due to the air which they draw from the upper regions of the atmosphere by their own friction. This vertical wind, which extends from the cloud to the ground, necessarily leaves behind it a partial vacuum, which produces an influx of air during the whole continuance of the storm.—*Les Mondes.*

NEW USE OF NICKEL.—Nickel is more fusible than iron, more malleable, more ductile, tougher and not affected by atmospheric influences. M. Fleitmann has found that when melted it absorbs some carbonic acid, and if a small quantity of magnesium is then added the metal becomes remarkably ductile and malleable. It can be drawn out into very fine wire or beaten into extremely thin leaves, and can be readily welded either to nickel or to iron.—*Chron. Ind.*

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending July 1.	Week Ending July 8.	Week Ending July 15.	Week Ending July 22.
Alpha.	1.50	1.40	1.40	1.40
Alta.	1.90	1.80	1.80	1.80
Andes.	1.10	1.00	1.00	1.00
Argenta.	450	250	450	450
Atlantic.	350	150	350	350
Aurora Tunnel.	350	150	350	350
Baltimore Con.	1.35	1.25	1.25	1.25
Belmont.	300	150	300	300
Best & Belcher.	94	84	94	94
Bullion.	1.40	1.20	1.20	1.20
Bodie.	1.05	1.10	1.10	1.10
Bodie.	1.10	1.05	1.05	1.05
Bulwer.	31	2.95	31	2.95
Boyle.	600	550	600	550
Black Hawk.	600	550	600	550
Belvidere.	3	2.21	2.50	2.30
Booker.	300	450	400	350
Booker.	300	450	400	350
California.	2.15	2.10	2.10	2.05
Challenge.	3.10	2.90	2.90	2.85
Chollar.	3.10	2.90	2.90	2.85
Confidence.	350	250	350	350
Con Imperial M Co.	300	250	300	300
Con Virginia.	31	1.55	3.40	3.20
Crown Point.	14	1.55	3.40	3.20
Con Washoe.	750	500	750	500
Champion.	750	500	750	500
Concordia.	750	500	750	500
Dayton.	750	500	750	500
DeFrees.	750	500	750	500
Dan.	750	500	750	500
Day.	750	500	750	500
Eureka Con.	174	184	184	184
Excelsior.	1.70	1.60	1.60	1.60
Endowment.	1.30	1.20	1.20	1.20
Gen Thomas.	1.30	1.20	1.20	1.20
Grand Erie.	1.30	1.20	1.20	1.20
Gila.	1.30	1.20	1.20	1.20
Golden Chariot.	1.30	1.20	1.20	1.20
Golden Terra.	1.30	1.20	1.20	1.20
Goodrich.	1.30	1.20	1.20	1.20
Goodrich & Curry.	3.45	3.15	3.45	3.20
Hale & Norcross.	41	3.80	41	3.80
Hillside.	550	400	550	400
Highbridge.	550	400	550	400
Homestead.	550	400	550	400
Hussey.	550	400	550	400
Independence.	400	350	400	350
Julia.	600	500	600	500
Justice.	600	500	600	500
Jackson.	600	500	600	500
Joe Seates.	600	500	600	500
K K Con.	600	500	600	500
Kentuck.	600	500	600	500
Kosuth.	600	500	600	500
Keystone.	600	500	600	500
Lady Bryan.	250	200	250	200
Lady Wash.	250	200	250	200
Leviathan.	250	200	250	200
Leeds.	250	200	250	200
Lee.	250	200	250	200
May Belle.	450	300	450	300
Modoc.	1.20	1.10	1.10	1.10
Manhattan.	1.20	1.10	1.10	1.10
Martin White.	600	500	600	500
McClintock.	250	200	250	200
Meadow Valley.	250	200	250	200
Mexican.	250	200	250	200
Mides.	250	200	250	200
Morning Star.	250	200	250	200
North Con Virginia.	250	200	250	200
New York.	250	200	250	200
Northern Belle.	250	200	250	200
New Coso.	250	200	250	200
Navajo.	250	200	250	200
Occidental.	250	200	250	200
Oregon.	250	200	250	200
Oriental.	250	200	250	200
Overman.	250	200	250	200
Panther.	250	200	250	200
Phenix.	250	200	250	200
Phil Sheridan.	250	200	250	200
Potosi.	250	200	250	200
Prospect.	250	200	250	200
Raymond & Ely.	250	200	250	200
Richer.	250	200	250	200
Rock Island.	250	200	250	200
Rye Patch.	250	200	250	200
Rough & Ready.	250	200	250	200
Sage.	250	200	250	200
Sierra Nevada.	250	200	250	200
Silver Hill.	250	200	250	200
Silver King.	250	200	250	200
Silver Prince.	250	200	250	200
Sonor.	250	200	250	200
Summit.	250	200	250	200
Syndicate.	250	200	250	200
South Bodie.	250	200	250	200
South Standard.	250	200	250	200
Star.	250	200	250	200
St. Louis.	250	200	250	200
Syndicate.	250	200	250	200
Toga Con.	250	200	250	200
Tipton.	250	200	250	200
Trojan.	250	200	250	200
Union Con.	250	200	250	200
Utah.	250	200	250	200
Vermont Con.	250	200	250	200
Ward.	250	200	250	200
Wells-Fargo.	250	200	250	200
White Cloud.	250	200	250	200
Yellow Jacket.	250	200	250	200

Sales at S. F. Stock Exchange.

Thursday A.M., July 22.	800	Bodie Isle.	750
60 Alpha.	4.40	100 Belmont.	200
70 Andes.	700	50 Belvidere.	200
230 Bullion.	1.60	370 Black Hawk.	300
200 Benton.	300	300 Booker.	350
300 Belcher.	1.70	60 Boston.	900
105 Best & Belcher.	70	10 C Pacific.	70
220 Crown Point.	1.20	50 Coucouard.	700
250 California.	2	50 Champion.	550
450 Chollar.	2	300 Day.	450
470 Gould & Curry.	2.00	330 D San Diego.	400
55 Hale & Nor.	2.85	50 E M Diablo.	400
20 Justice.	650	185 Grand Prize.	1,150
230 Julia.	350	50 Gen Thomas.	250
55 Mexican.	250	570 Greenhow.	1,200
100 Mackey.	300	530 Jupiter.	1,200
200 New York.	300	30 Metallic.	400
100 Overman.	1.20	80 Mono.	1.85
125 Ophir.	750	35 Mt Diablo.	90
80 Potosi.	750	170 M White.	800
150 Quinn.	3.70	300 N Belle Is.	650
285 Scorpion.	1.45	30 Noonday.	3
10 Sag Belcher.	6	180 N Noonday.	3
500 Sarsaw.	100	100 Northern Belle.	110
445 Sierra Nevada.	100	150 Navajo.	150
150 Silver Hill.	250	25 Oro.	1.60
30 Utah.	80	300 Paradise.	350
110 Union.	250	100 Queen Bee.	250
375 Yellow Jacket.	200	250 Spridick.	800

A CUSTOM MILL AT BODIE.—We learn from the News, that the Silver Hill M. and M. Co. has purchased the Dunderberg mill, which is to be rebuilt immediately, at Bodie, and opened as a custom mill. This enterprise ought to prove of great advantage to the district.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co	Nevada	15	25 July 8	Aug 16	Sept 6	Butler Burris	309 Montgomery st
Belvidere S M Co	California	7	25 July 8	Aug 12	Sept 1	C Van Dyck Hubbard	310 Pine st
Belcher S M Co	Nevada	23	50 June 28	Aug 2	Aug 23	Joe Crockett	327 Pine st
Best & Belcher	Nevada	13	50 July 2	Aug 5	Aug 26	W Willis	309 Montgomery st
Bullion M Co	Nevada	15	100 June 2	Aug 7	Aug 27	J M Russell	328 Montgomery st
Chollar M Co	Nevada	3	50 July 19	Aug 23	Sept 13	W E Dean	309 Montgomery st
Concordia M Co	California	3	15 June 1	Aug 8	Aug 2	Wm J Taylor	310 Pine st
Con Imperial M Co	Nevada	12	10 July 15	Aug 19	Sept 9	W E Dean	309 Montgomery st
Crown Point G & S M Co	Nevada	42	50 July 14	Aug 20	Sept 10	James Newlands	S F Stock Ex
Ivanpah Con M & M Co	Nevada	3	25 June 9	Aug 13	Aug 19	Wm Willis	309 Montgomery st
Dudley M Co	California	9	25 July 10	Aug 12	Sept 8	E C Masten	309 Montgomery st
Mt Diablo M & M Co	Nevada	3	200 June 22	July 26	Aug 16	Chas N Shaw	408 California st
Gen Thomas M & M Co	Nevada	6	50 July 20	Aug 24	Sept 14	Wm Willis	309 Montgomery st
Highbridge S M Co	Nevada	1	30 June 23	July 26	Aug 17	J W Paw	310 Pine st
Ivanpah Con M & M Co	California	2	171 June 13	July 24	Aug 11	E J Friedlander	300 California st
Jupiter M Co	California	9	40 June 14	July 16	Aug 11	E C Masten	18 Nevada Block
Mammoth M Co	California	5	50 June 16	July 27	Aug 27	A W Rose, Jr.	302 Montgomery st
Mexican G & S M Co	Nevada	12	100 July 15	Aug 19	Sept 8	C L McCoy	309 Montgomery st
McCracken Con M Co	Arizona	5	40 June 26	Aug 4	Aug 25	A W Russell	216 Sansome st
Monte Cristo Con M Co	California	3	10 May 26	July 5	Aug 5	Butler Burris	309 Montgomery st
Mt Potosi Con M Co	Nevada	4	25 July 15	Aug 21	Sept 7	E A Holmes	318 Pine st
Murphy G & S Co	California	4	25 July 13	Aug 12	Sept 11	S D Rogers	328 Montgomery st
New York M Co	Nevada	23	15 June 7	July 10	Aug 3	D L Thomas	327 Pine st
North Bonanza S M Co	Nevada	6	50 June 7	Aug 4	Aug 25	W W Stetson	309 Montgomery st
Occidental Con G M Co	California	4	100 June 14	Aug 5	Aug 25	W T Smith	402 Montgomery st
Ophir S M Co	Nevada	35	100 June 4	Aug 9	July 29	C L McCoy	309 Montgomery st
Overman S M Co	California	5	50 July 14	Aug 16	Sept 6	Wm Burt	320 Sansome st
Overman S M Co	Nevada	45	50 June 2	July 16	Aug 23	E D Edwards	414 California st
Scorpion S M Co	Nevada	8	100 June 23	Aug 26	Sept 23	E B Holmes	309 Montgomery st
Silver Hill M Co	Nevada	11	25 July 17	Aug 23	Sept 13	Geo R Spilney	310 Pine st
Sierra Nevada S M Co	Nevada	61	100 June 22	July 27	Aug 16	E L Parker	309 Montgomery st
Phil Sheridan G & S M Co	Nevada	10	25 June 22	July 24	Aug 14	D L Thomas	309 Montgomery st
Telfair M Co	Arizona	3	100 June 8	July 17	Aug 7	J Pentecost	702 Market st
Tuscarora M & M Co	Nevada	6	15 June 26	Aug 2	Aug 23	M E Sperting	309 California st
University G M Co	California	6	121 June 10	July 14	Aug 3	Wm L Oliver	328 Montgomery st
Vortex M Co	California	1	100 July 12	Aug 9	Sept 6	G W Fisher	324 Pine st
Yellow Jacket S M Co	Nevada	33	100 July 10	Aug 17	Sept 16	Mercer Otley	327 Pine st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Butte Hydraulic M Co	California	4	100 June 22	July 27	Aug 17	L L Denney	729 Montgomery st
Cumbarland G & S M Co	Arizona	1	30 June 8	July 9	Aug 9	Jno H Griffiths	328 Montgomery st
Excelsior Deep Gravel M Co	California	11	10 June 16	July 17	Aug 9	D B Chisholm	327 Pine st
Original Keystone S M Co	California	3	10 June 16	July 17	Aug 9	E L Parker	327 Pine st
Peck M Co	California	1	100 June 1	July 1	Aug 1	Wm J Taylor	310 Pine st
Red Hill H M & W Co	California	3	100 June 1	July 1	Aug 1	C T Bridge	224 California st
Rowe G M Co	California	3	100 June 1	July 1	Aug 1	A B Paul	328 Montgomery st
Sierra Nevada G M Co	California	1	100 June 1	July 1	Aug 1	S D Rogers	328 Montgomery st
Yuba G M Co	California	10	200 June 19	July 24	Aug 4	Edward Lande	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Benton Con Co	Nevada	Isabella M & M Co	302 Montgomery st	Annual	July 28
Original Keystone S M Co	California	F E Lutz	330 Pine st	Stockholder's	July 27
Pacific G M Co	California	C T Bridge	224 California st	Annual	Aug 2

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Black Bear Q M Co	California	W L Oliver	Safe Deposit Bldg.	25	May 16
Consolidated Virginia M C	Nevada	A W Havens	309 Montgomery st	50	July 15
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	July 20
Father De Smet Con M Co	Black Hills	The Widmann	404 Montgomery st	50	June 30
Napa Goldfield Con M Co	California	Wm W Parrish	30 Pine st	50	June 15
New York Hill M Co	California	J B Leighton	527 Olay st	25	June 15
Northern Belle M & M Co	Nevada	Wm Willis	309 Montgomery st	50	July 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	July 12
Seventy-six S M Co	Nevada	E F Stone	306 Pine st	03	May 24

The Mining Share Market.

The mining share market remains as it was. The business of the past week was so similar in nearly all respects to that of the preceding week, that a report of its transactions might be embraced in the single word ditto. There were little oscillations one day followed by counter little oscillations the next day, and at the end of the week things were as they were at the beginning. The business begins to have a comic look; for, notwithstanding the queer condition of the market, the hope in the future of both holders and operators is palpable. If their reward shall be commensurate with their hopeful patience, it will be great indeed. At the mines work continues to be carried on with the energy corresponding to its system and magnitude. The engineers of the Comstock are contending with intense heat and vast volumes of water, and there is no reasonable doubt that they will overcome both. Indeed, the matter of ventilation may be said to be already well in hand. The far greater difficulty of controlling and disposing of the water will require more time and labor; but that it will be controlled, so that explorations may be prosecuted to the final development of ore bodies in the lower works of several mines, is the belief of many experienced mining engineers.

Surveys Recommended.

At the regular quarterly meeting of the Chamber of Commerce, held on the 20th inst., the following important resolutions were adopted: Resolved, That this Chamber hereby calls the attention of our Senators and members of Congress to the great usefulness of the United States topographical and geographical surveys of States and Territories west of the 100th meridian, as prosecuted by the Army Corps of Engineers, in charge of Capt. Geo. M. Wheeler, under the direction of Gen. A. Humphreys, and earnestly recommends that our delegation in Congress advocate, urge and vote for liberal appropriations for a continuance of said surveys in the interest of inter-State commerce and the protection of frontier settlements from Indian depredations, and as furnishing a safe guide to immigrants seeking homes in the West, as well as a reliable source of information to capital and enterprise disposed to develop new lines of travel and new fields of production. Caleb T. Fay, after some remarks upon the importance of the Alaska trade and the necessity for full preparations for navigation along the coast, especially referring to the Alaska coast, offered the following, which was also adopted: Resolved, That our Senators and members upon the Pacific coast be earnestly invited to work actively in securing an ample appropriation from Congress for the perfecting of a marine survey of the entire coast and the early issuance of complete maps and marine charts for the safe guide of movements in these waters.

Bullion Shipments.

Since our last issue, we have noticed the following bullion shipments: Paradise, July 16, \$4,186; Bodie, July 18, \$3,239; Northern Belle, July 18, \$12,346.94; Star, July 19, \$3,285. At Salt Lake City, July 11th to July 17th, inclusive: Horn Silver, \$127,500; Ontario, \$40,064. Christy, \$3,475.04; Barbet & Walker, \$6,175.23; miscellaneous, \$40,394; total, \$177,214.23. Desiring to make our list of Bullion Shipments as complete as possible, we will be thankful to receive from mining Superintendents and Secretaries notice of all bullion shipments from their respective mines. STRIKING REDUCED TO AN ART.—It seems, says the Railroad Gazette, that striking for higher pay has been reduced to an art. The other day a lot of track men on the Illinois Central road, in Iowa, engaged in replacing iron rails with steel, are said to have gained their end by first taking up about 1,000 ft. of track and then striking. Passenger trains were delayed seven or eight hours by this performance, and if the strikers had been arrested for obstructing the mails they would have been served right. Men have a legal right to quit work if they think they are not paid enough, but they have no right to do it in a way intended to damage the public. MEXICO has established a Government Bank, putting about \$600,000 of its notes in circulation.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

AMADOR. AMADOR CITY NOTES.—Dispatch, July 17: The Keystone company is engaged in the work of putting in new timbers and otherwise repairing their mill. The B

of the Squaw Hollow lead has been found and traced from the North to the Middle Fork of the Cosumnes. The ledge averages 30 ft in width, and is the same composition as that found at the Gross mine.

HASTON CREEK PLUM.—*Mountain Democrat*, July 17: Work has been resumed in earnest on this mine. The completion of this mine will have the town by better drainage than heretofore, and will enable the mine owners on Cedar and Spanish ravines to resume hydraulic mining.

ITEM.—The Chinamen, working in the cut at Morey's foundry, struck a rich streak recently. One man says a shovel yielded nearly half gold.

GREENWOOD NOTES.—We learn from Mr. Charles Nagler, of Greenwood, that the Gallagher mine is down about 70 ft, and is now being timbered preparatory for active work. The recent strike in this mine continues good.

NEW REDUCTION WORKS.—The Georgetown Divide reduction company is putting up an establishment at Greenwood for reducing sulphurets, assaying and working of gold-bearing ores in general. Prof. G. T. Deetken is the engineer and assayer in charge of the works.

INYO.

MODOC CO.—Independent, July 10: This company is pushing work ahead in the mine with a force of 30 men, under the active superintendence of J. S. Childs and foreman, William E. Smith. The mine is located on the main point of the main body of the ore, however, being in the foot of the West Lookout, 300 level. Wood and coal hauling will commence in a few days, and the furnace will be fired up about Aug. 10th.

DEEP SPRING VALLEY DISTRICT.—*Cor. Independent*, June 29: When I tell you there is a ledge here that will assay thousands of dollars per ton, I am only stating a fact I can prove when called upon. The ledge is not wide—running all the way from 6 inches to 3 ft in width—but much of the ore in the district will average \$150 per ton. There is some talk of Mr. Smith, of Teel's marsh, putting up a 6-stamp mill here this summer. Hickey & Walker built a mill here on credit and paid off their indebtedness in little over a year with its earnings. The facilities are all that could be desired; abundance of water free, with wood in unlimited quantities, and the cost will not exceed \$5 per cord.

MARIPOSA.

COUTLEVILLE NOTES.—*Gazette*, July 17: We learn that the shaft of the Martin & Wallace mine is clear of water, and that the ore is being taken from 2 sources in the mine, which bears the character of rock formerly taken from the mine, and is considered an excellent quality of ore. As soon as sufficient ore is brought to the surface, it is expected a mill will be erected.

FLANAGAN.—This mine has recently furnished its owner with another gold pocket, which it is famous for, and keeps its owner animated with a hope of striking larger and richer ones.

MALVINA.—The Cook Bros. are running a tunnel from Black creek through the mountain, some hundreds of ft, with a view to getting under the Malvina mine, which is expected to be completed some time in October next.

MONO.

LAKE DISTRICT.—*Manumoth City Herald*, July 10: Excellent progress is being made in the besider at tunnel No. 2, it having been advanced 48 ft during the week ending to-day; total length, 932 ft. In tunnel No. 3, 68 ft of headway has been made; total length, 1,132 ft. The upraise from this tunnel has now reached the height of 75 ft, 15 ft having been made during the past week. Considerable fitting up having been necessary in this vertical upraise, including, etc., only 310 tons of ore was sent to mill. Hereafter the quantity will be increased to 75 tons per day. The mill is kept constantly running to its fullest capacity, and in consequence of the many improvements in the application of the water power, it has not been found necessary to use any steam in driving the machinery.

H. L. & M. O. JOINT TUNNEL.—Owing to the breakage of drills, caused by the excessively hard character of the rock, the work was delayed a part of the week, but 14 ft made, giving a total length of 895 ft to date.

HOMER DISTRICT.—*Bodie Free Press*, July 16: We learn that while the towns started on Mill creek are at present dull and uninteresting, there is much honest work doing throughout the mines discovered last fall in advance of the storm. There is a road built up the main canyon, so that machinery and supplies can be hauled almost to the head of it, where the Homer M. & Co.'s operations are located. They have developed ore enough to justify them in erecting reduction works before the winter weather sets in. They are running both east and west crosscuts from the tunnel, on which the work of extension is also resumed. The shaft sinking on the rich Wasatch ledge to the east shows well, and it will be connected with the east crosscut for the purpose of ventilation and ore extraction. It is proposed to erect a 10-stamp mill, with capacity of 20, and run it by water, with which power there is abundant and convenient. Work is brisk and systematic on the May Lundy claim, in the Lake Canyon section of the district, and parties are discussing seriously the necessity of a wagon road up that way from the town of Lundy. There are probably 250 people in all in the district.

NEVADA.

DILLON MIN.—*Transcript*, July 15: This new find below Allison ranch continues to show gold below the surface. A local company of capitalists are negotiating for its purchase, and will proceed to work the claim with a good force of men. The mine is so situated on a hillside as to be easily worked for hundreds of feet without machinery.

MR. AUSTIN.—This company struck the ledge in their 300 level north work before last, and have resumed sinking and will go down 200 ft farther before extracting any ore. Thus they will soon be enabled to work the property on an extensive scale.

EL CAPITAN.—The ledge recently developed in the El Capitán mine on the 200 level, 65 ft south of the incline, has been explored for a distance of 20 ft. It averages about 18 inches in thickness, and is producing some very good-looking ore. The north drift on the same level, which is being pushed to develop the ledge in the Wheel Jane property adjoining, is now in 125 ft.

NOTES.—A. C. Gillespie, of Gold Flat, has recently erected an arastra and hoisting and pumping gear on his quartz claim. The machinery to be run with water from the Idaho ditch. On or about the 20th inst., the Blue Tent M. Co. will begin cleaning out their main ditch. The water will be turned off from it for a period of some 3 weeks.

BANNER HILL MIN.—*Herald*, July 13: It is expected that work will shortly be commenced at this mine. But a small force of men will be employed for the commencement. Machinery will be immediately placed in position, and everything will be in running order in a very short time.

MOHAWK.—This claim is still improving; work is being pushed preparatory to erecting machinery. The west drift is being driven as fast as possible, where a few days since a strike was made which is developing into a fine chute of ore over 3 ft thick, and proves to be good milling ore.

FORTUNA.—Such rapid progress is being made in the sinking of the shaft at this mine, that it is thought that it will be completed by the first of next month, when stations and drifting will be commenced. Some very good rock is at present being taken out.

MUSCHIE.—Work in the new shaft of this mine is progressing favorably. It is expected that it will be completed and the new 30-stamp mill erected and other improvements finished about the month of October.

NOTES.—Rapid progress is being made in the construction of the new chlorination works of the Merrifield mine. It is expected that it will be ready for operation in about 3 weeks. About 12 tons of fine rock taken out of the Johnson & Wheeler claim at Wood's ravine, is now being crushed at Keith's mill, and is yielding about \$20 per ton. The extra 5 stamps that are being put up at the mill of the Nevada City will be in running order by next Saturday.

Snow Point.—*Transcript*, July 14: Wand & Blackwell have 8 men at work on the main tunnel and drifts of their

new gravel discovery at Snow Point, and will increase the force as rapidly as room is made. The indications continue to be so favorable as they were last month.

ITEM.—Parties are prospecting for the lead on the opposite side of the ridge from Wand & Blackwell's claim.

DANIEL MIN.—The force of 80 white men at work at this mine was increased yesterday morning by putting on 24 Chinamen—the first Mongolians employed by the company. The new incline in Humburg creek, from which a bedrock tunnel is to be run to the vicinity of the hoisting works about 2,500 ft distant, has reached a depth of 75 ft.

GRAPHIC COX.—It is reported that within the past week the ledge in the new tunnel of this mine at Plinn valley increased in size from 19 to 36 inches, and is heavily charged with sulphurets. A force of 25 men is regularly employed in the mine.

PITTSBURG MIN.—*Transcript*, July 16: Work has been resumed in this mine, where nothing has been done for some time past. A contract has been let for sinking the incline, which is now down 850 ft, 150 ft further, so that the ledge can be developed at a depth of 1,000 ft. It is generally believed that this step will result satisfactorily.

The Pittsburgh has always proven a good mine when under proper management and with sufficient financial backing.

MILTON NOTES.—There is a great deal of prospecting being done in the neighborhood of Milton, on the line between Nevada and Sierra counties, since the snow disappeared this summer, and considerable excitement prevails. Work has been started on the Mastodon Con. Co.'s property, and the indications met with thus far are quite favorable.

Dr. Holdsworth and another party have just located a placer claim 1 mile in length on the Bald Mountain ledge. The Milton M. Co. sent down a \$3,000 brick from French Corral yesterday and it was shipped to the Bay.

LONG RIDGE M. Co.—*North San Juan Times*, July 17: This company is making arrangements for the construction of an iron pipe from Montezuma hill to their claims for the purpose of increasing their water power.

It is of the opinion that the expenditure will be compensated more than ten fold by the increase of bullion.

OAK VALLEY ITEM.—A silver ledge has been found at Oak valley, about 4 miles from Camptownville. Charles Biber and James McBride, in prospecting a quartz ledge for gold, came across some singular looking metal which they deemed worthless, and threw it aside. As they went down on the ledge they found larger quantities of the same, and finally concluded they would test it and see what it was. They did so, and found it to be silver. The ledge has been traced a distance of 4,000 ft, and the vein is 14 ft in width. Free silver is found all through the ledge, and the parties think they have struck a bonanza.

COLUMBIA HILL ITEM.—The Eureka Lako Co. have commenced sinking a shaft between their boarding house at Columbia hill and the old town of that name. They are determined to reach bedrock if possible, and if they find good paying ground, the company will run a tunnel to its Columbia Hill mines, commencing at the South Yuba river. The company is prospecting their mining ground at the old town to ascertain whether the ground will pay sufficiently to warrant the expense of a tunnel over 3 miles in extent.

KINGSLEY & HITCHCOCK.—*Transcript*, July 17: The incline on this mine in the north end district is now down 80 ft, the ledge at the bottom being 16 inches thick, and the walls clearly defined. The owners will continue extracting ore until they have realized enough gold to erect steam hoisting works, which they expect to be able to do this fall. To show the character of the ore, we will state that 15 tons of it, just as it came from the different parts of the ledge, averaged \$200 per ton.

BALD MOUNTAIN EXTENSION.—The tunnel of this company, near Forest City, is now in 2,200 ft, and the progress made is 150 ft a month. There are now only 1,400 more to run. Three shifts are being worked. The formation is still mountain lava. The Prest has ordered 2,000 ft of track from San Francisco.

BURZLOW MIN.—Owing to last week this mine, situated in the low end district, on the south side of the South Yuba river, has been producing very heavy sulphurets ore. When in 66 ft from the shaft the drift struck a 6-foot ledge. It is the same body of ore found in the shaft, but has increased in size to a remarkable extent.

ITEM.—Mr. Leahy has had a crushing made (the second) of 113 tons of dirt from the waste dump of the old Banner quartz mine in this district. He realized a little over \$8 a ton in free gold, besides 6% of sulphurets.

PLACER.

A RICH STRIKE.—*Herald*, July 17: Messrs. Nutting and Co. have just found the Cogsworth ledge near Clipper Gap. They have been prospecting on the ridge near the Auburn and Clipper Gap wagon road, and it is reported that they took out about \$1,000 in one day. Our informant says the find is scarcely second to the famous Pike Bell strike of a few years ago.

ITEM.—We learn that the mines at Last Chance are holding out well, and the season has been one of general prospecting and success. The Cogsworth ledge near Clipper Gap has been prospecting on the ridge near the Auburn and Clipper Gap wagon road, and it is reported that they took out about \$1,000 in one day. Our informant says the find is scarcely second to the famous Pike Bell strike of a few years ago.

LOWELL HILL NOTES.—*Dutch Flat Forum*, July 17: We are informed that the most extensive drift mining in Nevada county is on the ridge between Bear river and Steep hollow in close proximity to Lovell hill, where a great many thousand dollars have been expended in developing the immensely rich gold-bearing gravel leads.

EAST NEW YORK MIN.—The tunnel in this mine is in a fine state of about 2,000 ft, and they will now make an angle upward for the purpose of more fully determining what's there. The proprietors of this mine have taken out a large amount of gold since the mine has been opened.

WINE WEST.—The owners of this mine are working a force of 60 men. The tunnel is in about 900 ft, and they are working gravel that pays from \$2.50 to \$3 per car load. This mine is located a short distance from the Swamp Angel to the northwest.

MOROAN.—The tunnel in this mine, adjoining the Swamp Angel on the north, is in for a distance of about 1,100 ft, and plenty of pay gravel in sight. It is said to be the best arranged and equipped mine in that vicinity.

ITEMS.—We are informed that the Steep Hollow Tunnel Co. has struck, in the tunnel, at a distance of 180 ft, a lead of very rich blue gravel. This mine is between Lowell and Liberty hills. We understand a pretty fair strike has been made in the Franklin mine, just at the edge of town. There was \$15 taken out of two pans of dirt. They expect to find still better pay dirt soon.

PLUMAS.

ON THE LEAD.—*National*, July 16: There is not much doubt but that Loring & Leavitt have at last found the "pay streak" they have so long been looking for in their Elizabethtown claim, and that they will now reap the reward of years of patient toil. Mr. Loring showed us a nice lot of gold the other day, about \$100, which he says is taken from the mine. It is a fine, well-sorted, fashioned lead gold, some of the pieces weighing \$4 or \$5. The work since the pay channel has been found demonstrates that it is of considerable width, and there is reason to think that it will improve in richness as they drift up the canyon.

EMMAN'S MIN.—We learn from Eagle gulch that the owners of this mine are taking out very rich rock. The rock is taken from the mine, carefully assayed, and the best part of it crushed in a hand mortar, yielded about \$100 per day. The next grade is put into barrels and boxes, and will be worked in the arastra, and it is impossible to estimate what it will yield, but there is no doubt but that the figures will be astonishing.

GREENVILLE NOTES.—*Cor. National*, July 14: The Cherokee mine, owned by the Cherokee Mining Co. The yield in the old times was very large, but they were worked at a disadvantage, and no depth of any consequence was gained. Now, with the help of modern improvements in mining machinery, and with good management, the owners will open up one of the finest mines in the country. The Cherokee mines are connected with the far-famed Green Mountain.

ACACULAS.—This mine, in the same range of country, is one of the newly developed quartz locations. It was formerly known as the Savage and Wilson, and was worked some 12 years ago, but the company lost the pay streak and abandoned it. The present company has expended some \$2,000 in opening the mine, and last winter the work

proved successful. They have been taking out more bullion the last two months than the total of their expenditures, and there is still a large amount of pay ore in sight. The mine is situated within a half mile of the Kettis mill, where the rock can be hauled for 35 cents per ton, and a fine tract of timber adjoins the claim.

ITEMS.—The New York Co. start up their mill this week. The Southern Eureka is making a fine showing. The mines are all being worked this summer, and it is hoped that none will prove worthless.

SIERRA.

GOOD FLOW EXTENSION.—*Mountain Messenger*, July 17: A sample of the rock of the Good Hope Extension has been shown to us. It prospects about \$20 per ton. We believe this to be one of the best openings in the county.

THE 1001 MIN.—The owners of the 1001 mine are still pushing their work ahead, but have not yet reached the rim rock. The gravel is just as good as ever, and their prospects are very flattering.

PLUMASO MIN.—A run has been made at the Plumbago mine, at Minnesota, and the owners are satisfied with the clean-up.

TRINITY.

NEW RIVER NOTES.—*Cor. Journal*, July 17: At this time last year, ground sluicing was about over for want of water, but to-day hardly a is used, and as the snow is quite deep at this head of the creeks, we are assured of at least 6 weeks more running, or even 2 months.

DUTCH CO.—The Portuguese company is about to resume work on the ditch that they partially dug last summer. This is a ditch and mine some 3 miles long, and which, when completed, will carry water from the main river to what is known as Rattlesnake bar. This bar is some 25 acres in area and is just across the river from Big flat, and is said to prospect well throughout with a very high dump. They expect to have the water on it by next fall.

TUOLUMNE.

SPRING GULCH MIN.—*Independent*, July 17: We are pleased to state that the Spring Gulch mine is looking up in the shape of a bonanza. The owners concluded to sink 100 ft in their old shaft, and having attained a depth of 500 ft, they struck a vein of ribbon ore 2 ft at its bottom of the shaft, coming from the south and running north, which will go from \$40 to \$200 per ton.

NOTES.—Mr. Charles Waterman, one of the discoverers of the Olsen mine, has made another strike near Dunlap's, about 4 miles from Knight's Ferry, far exceeding in richness the first discovery.

YUBA.

EAGLE MIN.—*Marquette Appeal*, July 13: M. Higgins & Son, proprietors of the Eagle mine, at Indiana ranch, pocketed \$3,396 worth of gold crushed out by their 6-stamp quartz mill during the past 4 weeks. The mine has been paying excellently for 5 or 6 months past.

ITEM.—Supt. Jerome Deasy leaves this morning for the mines on the old Kessling claim, Rich gulch, having in his 3 large horse loads of material for the erection of hoisting machinery at the mines.

NEVADA.

WASHOE DISTRICT.

UNION CO.—*Gold Hill News*, July 21: Still cutting the drain in the main lateral drift, 2300 level. Winze No. 2 is down 50 ft below the 2400 level. South drift from winze No. 1 toward this winze is still in low-grade quartz containing places of greater value, but not milling ore as a whole. The northeast drift from Union shaft toward Sierra Nevada incline station, 2500 level, is averaging 7 ft per day. Total length to-day, 115 ft.

ORION.—The joint Mexican crosscut east on the 1000 level and to the Suro tunnel north lateral will be completed this week. The joint California raise from the 2300 level is advancing as rapidly as the extreme beat will allow. It is designed to connect with the joint winze from the 2000 level for ventilation.

CALIFORNIA.—The north drift on the 2300 level is making usual progress, no water material. It is designed to complete the connection on this level between the C. & C. and Union shafts.

CON. VIRGINIA.—The joint Beat & Belcher winze from the 2000 level, designed to connect with the 2300 level, has been commenced. No. 1 crosscut east on 2000 level is averaging 3 ft per day through good vein material carrying quartz in stringers.

SACRAMENTO.—The drift on the 1300 level has been swung round into a crosscut for the purpose of prospecting at a greater distance from the shaft the 11 ft of low-grade ore cut in the crosscut east after the clay wall was cut through. Bulkheading on the 2400 level against the water, on the 2200 and in this incline.

MEXICAN.—The drill run on the 2300 level has developed nothing of importance as yet, but some water has been encountered.

UNION SHAFT.—The 2500 pump is not yet running, but to-morrow connections will be made and it will be started as soon as these are completed. The work of raising the south compartment is now going on at 5 points, operations having been commenced on the 2000 level.

HALE & NORCROSS.—The endeavor to bulkhead the 2200 level against the Sacramento vein has been abandoned, owing to the loose character of the formation on that level south of the point where the stream flows into the drift.

SURO TUNNEL.—The headers of the north and south lateral branches are making excellent progress.

QUINN.—Sinking a winze in the casing of the ore body north of the main drift from the shaft, and encountering good ore. Still working to connect the old shaft with the 2000 level, and excavating for a station and tank on the 300 level.

SIERRA NEVADA.—The raise from the 2300 level to the bottom of the main shaft was commenced last Saturday, and is progressing well. The north drift on the 2400 level is to-day 1,050 ft in length, and is making 5 ft per day along the vein.

AURORA DISTRICT.

REAL DEL MONTE.—*Esmeralda Herald*, July 17: The tank and pump station on the 650 level has been completed and timbered up, and the tank put in place. During the week they have been engaged in putting in the pump, which will be in place by the end of the week. The connections are now being placed in position. When this is completed, sinking will be resumed.

CENTENNIAL.—There is no change in this mine as depth is attained. The ore is as rich at the bottom as at the top, and the width of the vein fully as great. Several tons are now on the dump.

GRAND TRUNK.—In the last week the crosscut has been advanced 21 ft. The face is now in quartz showing some mineral. It is thought next week will show what is the appearance of the ledge they are running for.

WEST ANTELOPE.—The Antelope is one of the old claims of the camp, from which so much rock was crushed in 1863-64. The West Antelope ledge appears to be a continuation of the Antelope, the rock being very similar. The ledge is from 3 to 4 ft in width, with well-defined walls.

THANKSGIVING.—The north drift is now in 21 ft, in good ore all the way. Several assays have been made from the ore taken from this drift, going as high as \$103.94 per ton. There is now about 150 tons on the dump ready for milling.

BRISTOL DISTRICT.

NOTES.—Pioche Record, July 10: The Bristol silver mining company is putting up the frame of their new mill and have already in place the battery, pans and settlers, and are rapidly pushing work ahead. The furnace of the Hillside mill and mining company started up Thursday with a large amount of ore in the dump and lead ore coming in rapidly. The Hillside 5th level, east, is daily improving, and more ore is being taken out than has been heretofore for some time past. Some fine lead ore is being shipped to the Hillside furnace from the Independence, Pioche.

CHERRY CREEK DISTRICT.

BROOKS MILL.—*Cor. White Pine News*, July 13: A portion of the machinery for Dr. Brooks' mill, at Silver canyon, is now on the ground, and everything is being pushed forward as rapidly as possible.

TEACUP MIN.—Profs. Newberry and Herr made a very thorough examination of the Teacup mine, taking samples from the face of every body of ore from this surface to the 770 level, spending 3 days at their labor and making a large number of assays.

COLUMBUS DISTRICT.

MOUNT DIABLO.—*True Vindicator*, July 17: The west drift on the 1st level has been advanced 11 ft this week. The east drift on the same level has also been advanced 10 ft. The crosscut north on the east drift has been extended 12 ft, and the crosscut south on the same level, 12 ft. The main shaft is down 343 ft, 10 ft having been made during the week.

LUCKY HILL.—The winze has reached a depth of 150 ft. The formation continues the same as noted before. The crosscut from the 110 level south is improving very fast. Some good ore is being taken out from this crosscut. The machinery for the hoisting works is expected in a short time.

CENTRAL JACKSON.—The lightning incline is still being sunk as rapidly as possible. The air in the crosscut from the lightning incline, southeast to the silver incline, is very bad, and work has been discontinued.

MOUNT ROSE DISTRICT.

STRIKE IN THE BULLION.—*Silver State*, July 17: We are informed by Deputy Sheriff Adams, of Paradise, that a very important strike has been made in the Bullion mine. Mr. Adams left Spring City on Tuesday, and he says he saw specimens of the ore which were covered with ruby and native silver. The foreman of the mine informed him that the ore body had been uncovered for several ft, and the ore was as rich, if not richer, than anything ever before found in the mine.

PIOCHE DISTRICT.

BULLIONVILLE MIN.—*Record*, July 10: Work will be resumed on the Bullionville mine, which is located about 15 miles southwest of town. Henry Raymond and a B. McGee have entered into an agreement with the owners of the above-named mine to do \$10,000 worth of work upon the same for 1/2 interest in the mine. The money was put up and work commences immediately.

INDEPENDENCE.—The boys engaged in taking out ore from the Independence mine, on Wednesday commenced hoisting it through the Newark shaft.

PARADISE DISTRICT.

CREDIT MOBILIER.—*Silver State*, July 17: We understand that operations are to be resumed on this mine shortly. This district, which is situated in the range of mountains between Paradise valley and the Humboldt river, must not be confounded with Mount Rose district, in which what are known as the Paradise mines are located. The Credit Mobilier is an old location, and a few years ago, when a shaft was sunk on the ledge, it produced some of the richest gold-bearing quartz ever found in this part of the country.

WHEEL COUNTY NOTES.—The Bullion, of the Paradise company, has, we are informed, purchased about the second-class ore at the Ohio mine, and are now making arrangements to have it hauled to the Sedan mill.

REBEL CREEK DISTRICT.

RICH ORE.—*Silver State*, July 17: We are informed that a body of ore has been struck in the Ohio mine, in Rebel Creek district, samples of which assay \$8,000 per ton.

EUREKA DISTRICT.

JACKSON.—*Sentinel*, July 11: The flow of water has been so great as to prevent operations in the main shaft for some time, and work has been confined to the 0th level.

DEADHORSE.—Martin Piantoni has struck an 18-inch vein of ore in the main shaft of this mine that will assay from \$100 to \$125. He expects to make a shipment to the Eureka Con. reduction works shortly. The main shaft of the mine is now down over 100 ft, and some 800 ft of drifts, etc., have been run.

EUREKA COX.—The mine continues to look well, and the 2 furnaces are running steadily, the ore-bins at the mine and at the reduction works being full. Prospecting is now chiefly confined to the 7th, 8th, 10th and 11th levels.

ARIZONA.

GLOSH DISTRICT.—*Silver Belt*, July 10: Messrs. Harrod, Hutchins & Yates, of Richmond basin, have presented Dr. Stalls cabinet specimen of Silver gulch ore which will assay \$8,000 per ton. These gentlemen are taking out very fine ore.

MACK MORRIS.—This mine is producing exceedingly rich ore. A short distance from the winze about 4 tons were taken out on Wednesday, which were supposed to contain \$3,600. This was only a part of the ore taken from the mine on that day, but was the most valuable per ton. Mr. Campbell informed us that 50 tons of rich ore were hauled from the mine to the mill on one day this week.

STONEWALL JACKSON.—Another most remarkable strike in the Stonewall Jackson is reported. If, as represented to us, it hegars description. Besides a 4-ft body of high-grade shipping ore, there is a 6-inch vertical streak of native silver on the footwall. We are not sufficiently advised to state at what depth the discovery was made, but are impressed with the belief that the ore discovered where the water came into the shaft (450 ft from the surface) with such volume as to temporarily force suspension of work.

COLORADO.

CLEAR CREEK COUNTY.—*Colorado Miner*, July 10: We have just made an examination of the Thunderbolt Dundee mine, and in all the various workings there is a fine quality about. There are 163 men employed. There are 4 levels in the upper workings in the A level, where a force of men are at work. The breast of this drift is now about under the Dundeeberg shaft. Two stops in the B level, some 60 ft above, are being worked. Assays from the ore found here have run as high as 14,000 ounces. The ore averages from 6 to 12 inches thick. The company has an assay office at the mine, so that after the ore has gone through the mill it is assayed, and its real value is known before it is shipped.

Origin and Classification of Ore Deposits—No. 2.

(By PROF. NEWBERRY, in the *School of Mines Quarterly* for March.)

Fissure Veins.

These veins occupy crevices which have been formed by subterranean forces and have been filled from a foreign source. They traverse indiscriminately all kinds of rock, and are without definite limits laterally or vertically. They have as characteristic features smooth, striated, sometimes polished walls (slickensides), clay-gouges or selvages on one or both sides, and a banded or ribboned structure throughout. The vein-stone is usually quartz, and the constituents include the ores of all the metals. The mode of formation of fissure veins is apparently this: In the regions where the earth's crust is broken up in the adjustment of the cold and hard exterior to the cooling and shrinking nucleus, cracks are formed, often miles in extent, along which the rocks suffer displacement, sliding on each other to form what are known as "faults." As the planes of these faults are more or less undulated, with displacement the bearing is upon the projecting bosses of each side. Between these, open fissures are left of greater or less dimensions. These reach down to a heated zone, and form the conduits through which thermal waters flow to the surface. Such waters coming in different localities from different depths, and leaching rocks of various composition under great pressure and high temperature, having great solvent power, become loaded with various mineral matters. As they rise to the surface, the pressure and temperature are reduced, and the materials held in solution are deposited to line and perhaps ultimately fill the channels through which they flow. This theory of the filling of mineral veins—that is, by precipitation from heated chemical solutions coming from below—is supported by such an array of facts that it must be accepted by all who will make a careful and unprejudiced study of the subject. It is true, however, that various other theories have been at one time or another put forth for the explanation of the phenomena. Among these, a few deserve a passing notice. They are:

1. *The theory of igneous ejection*, according to which the matter filling mineral veins has been erupted like that of trap dikes, and such veins as those of Lake Superior containing metallic copper have been suggested as affording good examples. But here we find metallic copper and silver associated, and each chemically pure; whereas, if they had ever been fused, they certainly would have formed an alloy. The copper is also found in crystals of calc-spar and other minerals, where it must have been deposited with the other constituents of the crystal, and that crystal formed from solution. Other opposing facts might be cited; but it will be sufficient to say that not one sound argument can be advanced in favor of this theory.

2. *Aqueous deposition from above*. This theory, first advanced by Werner, but since generally abandoned, supposes the contents of mineral veins to have been deposited from a solution which flowed into the fissures from above; but in that case the vein-matter should be horizontally stratified, limited in extent downward, and spread over the surface adjacent to the fissure; whereas no one has yet reached the limits in depth of the ore in a true fissure-vein, and the characteristic banded structure can only have resulted from successive depositions of long-continued flow of a hot solution. This theory has been recently advocated in this city, by Prof. Stewart of Nevada; but it is not only not sustained, but is really disproved by all the facts observed by the writer, in some years devoted to the study of our Western ore-deposits.

3. *Lateral secretion*. According to this theory, the material filling all mineral veins has leached into the cavity from the wall-rocks. While this is true of gash veins, it can have played but a very subordinate part in the deposition of ore in fissure veins. This is proved by the facts that different sets of fissures which cut the same formation frequently contain very different ores; and where the rocks of totally different character are, by faulting, brought to form opposite walls of a fissure, the ore may be symmetrically deposited in corresponding layers. It may also be said that the same fissure frequently traverses several formations, and yet its character may be essentially the same throughout.

4. *Sublimation*. The facility with which certain metals are volatilized, and the fact that various minerals have been deposited from vapor, have formed the basis of this theory; yet it is difficult to see how any one can ascribe more than a local and insignificant effect to this cause. It is true that the action of water, as steam, is much the same as when fluid and highly heated, in the solution and transport of minerals; and the deposit of mercury, sulphide of iron and even gold, from the mingled steam and water of the California geysers proves this. So we may concede that steam has been an agent in the chemical solution and precipitation of ores; but this is a very different thing from the sublimation of the metals represented by these ores, and all knowledge and analogy indicate that the silica which forms so large a part of vein-stones, and is so often seen in combs of interlocking crystals, has been deposited from an aqueous solution. But argument is really wasted in a discussion of the filling of fissure veins, since we have examples that seem to settle the question in favor of chemical precipi-

tation from ascending hot water and steam. In the Steamboat springs of western Nevada, for example, we in fact catch mineral veins in the process of formation. These springs issue from extensive fissures which have been or are filling with siliceous vein-stone that carries, according to M. Laur, oxide of iron, oxide of manganese, sulphide of iron, sulphide of copper and metallic gold, and exhibits the banded structure so frequently observed in mineral veins.

In regard to the precise chemical reactions which take place in the disposition of ores in veins, there is much yet to be learned, and this constitutes an interesting subject for original investigation, which I earnestly commend to those who are so situated that they can pursue it.

It may be noticed, however, that the thermal springs that are now forming deposits like those in fissure veins, contain alkaline carbonates and sulphides, and we have every reason to believe that highly carbonate alkaline waters containing sulphureted hydrogen under varying conditions of temperature and pressure are capable of taking into solution and depositing all the metals and minerals with which we meet in mineral veins.

To these necessarily brief notes on the filling of mineral veins should be added some interesting examples of the mechanical filling of fissures which have been recently brought to light in Western mining. These are furnished by the remarkable deposits of gold and silver ore in the Bassick and Bull-Domingo, near Rosita, Colorado, and the Carbonate mine at Frisco, Utah. All these are apparently true fissure veins, filled to as great a depth as they have yet been penetrated, by well-rounded pebbles and boulders which have fallen or been washed in from above. The porous mass thus formed has been subsequently saturated with a hot ascending mineral solution, which has cemented the pebbles and boulders together into a conglomerate ore. In the Bassick, this ore consists of rich telluride of silver and gold, free gold, and the argentiferous sulphides of lead, zinc, copper and iron. In the Bull-Domingo and Carbonate mines, the cementing matter is argentiferous galena. That the pebbles and boulders have come from above, is distinctly shown by the variety in their composition and the organic matters associated with them. In the Bull-Domingo and the Bassick, the pebbles consist of various kinds of igneous rock, mingled with which in the latter are masses of silicified wood and charcoal; while in the Carbonate mine, the pebbles are mainly trachyte; but with these are others of limestone and quartzite.

Fossils and other foreign bodies have before this been found in mineral veins, and Von Cotta mentions the occurrence of quartz pebbles, extending to the depth of 155 fathoms in the Gruner Lode at Schemnitz, Saxony; but no conglomerate veins like those mentioned above are known to exist elsewhere, and they constitute another of the many new forms of ore-deposit which the exploration of the rich and varied mineral resources of the United States has brought to light. To enumerate and classify these, has been the chief object of this article.

In regard to the ultimate source of the metallic matters which give value to our ore-deposits, but little can be said with certainty. The oldest rocks of which we have any knowledge, the Laurentian, contain gold and copper, which are indigenous, hence as old as the rocks that contain them, and have been simply concentrated and made conspicuous in the process of their metamorphism. These rocks are all sediments, and the ruins of pre-existing continents. By their erosion, they have in turn furnished gold, copper, iron, etc., to later sediments by mechanical dispersion and chemical solution. We now find gold everywhere in the drift from the Canadian Highlands, and we have every reason to believe that all the sedimentary strata more recent than the Laurentian have acquired a slight impregnation of several metals from them in addition to what they have obtained from other sources, and we may conclude that the distribution of many of the metals is almost universal. Sea-water has been proved to contain gold, silver, copper, lead, zinc, cobalt, nickel, iron, manganese and arsenic; and there is little doubt that all the other metals would be found there if the search were sufficiently thorough. Hence, sedimentary rocks of every age must have received from the ocean in which they were deposited some portion of all the metals, and for the formation of metalliferous deposits some method of concentrating these would alone be required. A pretty theory to explain such concentration through the agency of marine plants and animals has been suggested by some German mineralogists, and amplified by Profs. Pumpelly and T. S. Hunt. Plants have been credited with the most active agency in this concentration; but evidence is still wanting that either plants or animals have played any important part in the formation of our mineral deposits. The remains of sea-weeds are found in the greatest abundance in a number of Paleozoic rocks, and it is almost certain that the carbonaceous ingredient in our great beds of bituminous shale has been derived from this source; yet we find there no unusual concentration of metallic matter, and none of the precious metals has ever been detected in them.

The metallic solutions which have formed our ore-deposits have been ascribed to two sources. One theory supposes that they have drained highly metalliferous zones deep in the interior of the earth; the other, that they have leached diffused metals from rocks of different kinds comparatively near the surface. The latter

view is the one that commends itself to the judgment of the writer. However probable such a thing might seem, no evidence of the existence of distinct metallic or metalliferous zones in the interior of the earth has been gathered. On the contrary, volcanic emissions, which may be supposed to draw from a lower level than water could reach, are not specially rich in metallic matters, and the thermal waters which have by their deposit filled our mineral veins must have derived their metallic salts from a zone not many thousand ft. from the surface. The mineral springs, which are now doing a similar work, are but part of a round of circulation of surface-water, which, falling from the clouds, penetrates the earth to a point where the temperature is such as to drive it back in steam. This, with fluid water under pressure and highly heated, possessing great solvent power, may be forced through vast beds of rock, and these be effectually leached by the process. Should such rocks contain the minutest imaginary quantity of the metals, these must inevitably be taken into solution, and thus flow toward or to the surface, to be deposited when, by diminished temperature and pressure, the solvent power of the menstruum is diminished. It is evident from these facts that we cannot trace the history of the metals back beyond the Laurentian age. And since we find them diffused in greater or less quantity through the sedimentary rocks of all ages, and also find processes in action which are removing and redepositing them in the form of the ore deposits we mine, it is not necessary to look farther than this for a sufficient theory of their formation.

Baggage Checks in Court.

Passengers cannot complain if checks for baggage are not given; nor is one company bound to give them because others do. Upon the other hand, the refusal to give checks does not impair the passenger's rights; he is entitled to have his property safely carried and re-delivered to him at the end of the trip, check or no check. In Missouri a traveler came to a depot in St. Louis bringing a trunk and a roll of carpeting, and asked for checks for both. The baggage master gave him one for the trunk, but would not give any for the carpeting, for, he said, he would strap it on the trunk, and one check would do for both. But the carpeting was lost on the journey, while the trunk was safely delivered. In the lawsuit the company said that the baggage master was forbidden to give checks for anything but proper baggage; that passengers were not entitled to carry carpeting in rolls; and as this piece was not checked, there was no liability. But the court said that if the baggage master thought that the parcel was not proper baggage, he should have refused to take it. By accepting it for baggage, he rendered the company liable, and his declining to give a check did not make the slightest difference in the legal responsibility. In Connecticut a traveler brought his trunk to the station in the forenoon and asked to have it checked for the 3 P. M. train to Bridgeport. The baggage master said that baggage could not be checked for that train until a quarter before three. The traveler then left the trunk in the baggage room. At a quarter before three he returned, obtained a check, and in due time traveled to Bridgeport. On arriving there he found that money and clothing had been stolen from the trunk; but whether during the trip or while the trunk was lying unchecked in the baggage room no one knew. And the court said that this made no difference. If the baggage master received the trunk as baggage to be carried for a passenger, the company was liable for it from that moment, check or no check. The check is in the nature of a receipt, which may be given at any time; it is not the contract, but only evidence of the delivery and identity of the baggage. What fixes the liability of the company is the passenger's delivering it and the baggage master's accepting it for transportation; and the liability begins at the moment of the delivery and acceptance.—*Railroad Gazette*.

GRAVEL MINES AT DAYTON, NEV.—It now seems, says the *Gold Hill News* of July 15th, that the Dayton gravel mining company is about to be paid for the time, trouble and expense of locating their claim and opening it up. They have sunk 20 ft. to bedrock and run a tunnel 180 ft., which gives about two ft. of good pay dirt on top and 10 inches on the bedrock, which is rich. The bedrock is soft lava, just the stuff to catch and save fine gold. This pay dirt must be raised the 20 ft. and washed. A bucketful (eight pans) recently gave \$1.50. Washing has to be done with the water of Gold Canyon, which is at times unfit for use; still it will do something. The mine is 34½ ft. above the Carson, and if the company was wealthy enough to get the water company to run a flume down there and give them clean water with a fair head, so that they could commence and sluice back from the river to their claim, which consists of 160 acres, it seems as though that would be the way to get their gold. Doubtless the sluicing of the channel back to the claim would pay the outlay. Even with present facilities it looks as though there was coin for the company in their undertaking. Two men just above the claim of this company washed out \$270 in four weeks without any facilities whatever; and now that the company have at command so much good dirt near the bedrock, they ought to get their money back, and more too. Their gold is worth \$15.30 per ounce.

The Course of Empire.

"Westward the course of empire takes its way" quotes the *Chicago Journal of Commerce*. Since the census of 1870 the Western States and Territories have shown a wonderful increase in their populations. It is yet too soon to obtain results, but as a striking instance of this increase, we may cite Nebraska. The returns so far received from that State show that its population has increased from 128,000 to 500,000. Under the new reapportionment Nebraska will secure about four additional Congressmen. Notwithstanding the large increase in the State—nearly 400%—the population of Omaha has increased but 16,000 in the past decade. As Senator Paddock says, "this illustrates the desire of the European immigrant to possess a farm rather than a city." Unquestionably when the returns are in from Kansas, Wyoming Territory, Dakota and Minnesota, we shall find that their increase has been little else than remarkable. Nebraska has rightly assumed the place of one of the most prosperous States of the Union within the past 15 years. Her progress has been a marvel of energy and success. When the Colfax party went up the Platte valley in a stage coach in 1865, there were a few scattered settlements and cities on paper along the Missouri river, and Fort Kearney, with a few houses surrounding it, with stage stations at regular intervals, were all the signs of life found to the west line of the State, and, in fact, all the way to Denver. For 200 miles or more there were new-made graves to mark the slaughter of white men and women and children by the murderous redskins of the year before. The Union Pacific railway has changed all this, and now farms and hamlets and thriving towns dot the valley of the Platte all the way to the mountains. And it should be known that this great valley, prosperous and growing rapidly as it is, is by no means the best part of the State. The country on either side, beyond the bluffs that bound it, is richer by far than what the tourist sees as he dashes by on the cars in the Platte valley. It is a rich, rolling prairie, well watered, and is still rapidly settling by an energetic, thrifty population. The valleys of the Niobrara, the Elkhorn and the Loup Fork drain the northern half of the State. The Platte sweeps nearly through its center from east to west, while the Republican and other streams drain the southern sections. The result of the census just taken goes to show how ignorant the old geographers were when they marked a large portion of Nebraska and Kansas, which we used to see in the atlas of our school-boy days, as the "Great American Desert."

THE GOOD WORK OF A FRENCHMAN.—An agreeable duty of the French Academy each year is to award the Monthyon prizes, says the *New York Mail*, of which one is given to the author of the work most conducive to the promotion of public morals. The latter prize was bestowed last year on Hector Malot for a novel, which has been translated under the title "No Relations," and published by Messrs. J. B. Lippincott & Co., Philadelphia, in an inexpensive though well-printed form. It would be wise for those story-tellers who desire their works to teach a good moral lesson to study the art of Malot. Without preaching, without sermonizing, without enunciating moral axioms, by the acts of his personages and the development of his plots alone, the charming art of the author renders virtue attractive. He depicts with entire probability a child sold by the husband of his foster mother to a strolling fiddler, and yet growing up free from vice, and with a loving, grateful and good nature. The child is supposed to be a foundling, but turns out to have been stolen from a rich mother to whom he is restored. From the account of the vagabond life of the lad we rise with a better opinion of human nature, and deep admiration of the healthy imagination of the author, who, by his simple, sweet and unaffected narrative, has cast the glow of romance over people in very humble circumstances, and given a succession of descriptions remarkable for clearness and delicacy.

GOLD MINING IN AUSTRALIA.—We have received the official report on the mineral statistics of Victoria for the last year. The gradual development of the newly discovered lodes at Ballarat and the improved yield from lode mines at Maldon and other places, together with the assistance rendered to prospecting by the government diamond drills, appear to have a beneficial effect upon mining enterprise, as the report shows a slight increase. The quantity of quartz crushed during the past year was about 20,000 tons less than in 1873, but the yield of gold nearly 1,000 ozs. in excess. The average yield of crushing stuff was 1 cwt. 14.96 grs., being a less average than that of 1878. The decline in the mining population has been arrested and there is an increase of alluvial miners to the number of 265, and 652 quartz miners, on the preceding year. The Chinese are under 10,000, and show a decrease of 523 on the year. The average earnings is £76, or 30s per week. In the way of deep sinking, it is mentioned that one of the shafts at Stawell is 2,273 ft. in depth.—*Thames (N. Z.) Advertiser*.

RAWHIDE FOR JOURNAL BOXES.—Rawhide is said to make good journal boxes for machinery. A practical machinist says: "I have run a piece of machinery in rawhide boxes for 14 years without oil; it is good yet, and runs at 4,500 revolutions per minute. I put it in while soft and let it remain until dry."

THE ENGINEER.

Fast Railroad Time.

Experiments to Test the Speed that May be Reached by Locomotives.

A short time ago the New York Times printed a letter from a correspondent who undertook to correct a statement that a train which it is proposed to run regularly between Jersey City and Philadelphia—90 miles in 90 minutes—would be among the fastest in this world. His examples of fast trains were not so striking as they might have been made, however. Knight's "Mechanical Dictionary" records that Stephenson's Rocket traveled at the rate of 60 miles an hour over 50 years ago, when the art of building locomotives was in early infancy. The same authority gives 81 miles in 81 minutes, made by a special official train on the New York Central railroad, as the fastest time ever made in the United States. Scarcely inferior is the record of 72 miles in 73 minutes, made by a train between Lima and Dayton, including two stops. The best English record is 13 miles in 10 minutes, or at the rate of 78 miles an hour and one mile in 46 seconds. The special train which carried to Queen Victoria the decision of this Government in the Trent difficulty, in 1862, ran 31 miles in 144 minutes, or at the rate of 54½ miles per hour. These are exceptional cases, however, and if there is any train in the world which proposes a regular schedule time of 9 miles in 90 minutes, with no deductions for any cause—which is a very difficult thing from the occasional rate of a mile a minute—its existence is not generally known.

Probably the fastest train in England is that between London and Swindon, on the Great Western railroad, which travels at the rate of 53½ miles per hour. The northwestern road runs a train from London to Rugby at the rate of 4½ miles per hour, and the Great Northern Co. one from London to Peterborough at the rate of 50 miles in 60 minutes. The London-Heyhead, or "Wild Irishman" train runs only at the rate of 43 miles. Probably the fastest French train is the one which runs from Paris to Larseilles at the rate of 40 miles an hour, and on the Berlin and Hamburg road a train covers the 57½ miles between Spandan and Stieritz at the rate of 12 miles per hour. American need not be ashamed to add to the record the Pennsylvania railroad train between Jersey City and Germantown junction at the rate of 49 miles per hour, and the proposed train, taking the average of the whole distance is, as we said, the fastest regular train run.

The pattern of engine by which it is proposed to attain this result, though common in England, is unusual, though by no means unknown here, and is a curious instance of reversion to an original type. Our engines are designed rather for power than speed; and as an engine's dragging power depends largely upon the adhesion of its driving wheels, our engines are generally heavily built, and have at least four drivers, in order the better to distribute the weight. An extreme example is an engine built in 1878, with eight driving wheels. It weighed 118,000 lbs., and we have never seen any correction of the statement then made that it was the largest and most powerful engine ever made in the United States. In engines of this type, the driver have to be coupled together by the "parallel-rods," which are subjected to an enormous straining strain, when the engine is put to its speed, and which have been known to break in disastrous results. And even where this risk is taken, it is very hard to make small wheels evolve fast enough to give great speed.

The remedy indicated is to increase the size of the drivers, and to get rid of the connecting-rod by reducing the number of drivers. Accordingly we find the new engine to be in this respect, very much like Stephenson's "Rocket." It has only two driving wheels—one on each side, and not both on the same side, as the Railroad Gazette seems to have misunderstood the Times say—and each is connected directly with a driver. In order to redeem its schedule promises, this engine will have to travel sometimes at least 70 miles an hour, as it is necessary to slacken speed in rounding curves and pang through cities. The drivers are to be 6½ ft. diameter, which is a foot larger than is usual in this country, although in England, as our correspondent pointed out, 7½-ft. drivers are frequent, and, we believe, one engine has 10-ft. drivers.

EXTINGUISHING FIRES WITH STEAM.—The technic journals are again mooted the subject of the extinguishment of fires by means of steam, which appears to attract periodical attention. There can be no question that under certain circumstances, the application of steam for this purpose named will be vastly more useful and active than that of any other agent. The circumstances may be briefly described to be where a building, or portion of a building, is on fire where the fire has not burned out to their. Under these circumstances steam may render invaluable service, since, in most cases, this character, the fire can be speedily extinguished by its use with but a fraction of the loss to merchandise that invariably attends the use of water.

USEFUL INFORMATION.

ALUM IN BREAD.—Ostensibly, baking powders, for the most part, have for a basis cream of tartar and carbonate of soda; but cream of tartar itself is notoriously subject to adulteration, inasmuch that it is kept by wholesale dealers in distinctive grades, the lowest being grocers'—commonly adulterated with an earth which contains alum—the kind retailed to mix with an equally impure carbonate of soda as extemporized baking powder for home-made bread. To discover whether bread is adulterated with alum, soak a portion in water, and add to the water, in which the bread has been soaked, a solution of chlorides of lime, a little at a time, carefully stirring; if alum is present the mixture will be pervaded with milkiness, otherwise this liquid will remain limpid. To detect alum in flour is more difficult. The only safe course for housekeepers is to use flour and baking powders of known brands; to eschew all extemporaneous baking powders especially; and use such only as are known to be chemically pure and free from all injurious substances. And in this connection, without any reflection on such as have not been brought to our notice, we feel fully warranted in recommending this brand we have long used in our own household—the "Royal Baking Powder"—which we have frequently examined, and always without finding any impurity whatever.

ELECTRICAL PAVEMENTS FOR CITY LOCOMOTION.—The latest suggestion for the use of electricity as a motive power is to have the streets of cities paved with iron, either in blocks or so arranged that the pavement will form continuous electrical conductors, divided into suitable sections, each section to be charged with electricity by a stationary steam engine and dynamo machine of proper size. On the electrical pavements thus provided, wagons, carriages, fire engines, omnibuses and other vehicles, each provided with an electrical driving wheel, and taking electricity through the wheel from the pavement, may be run, in any desired direction, with more ease and certainty than by the present system of horse locomotion, although that system would not necessarily be interfered with, as those who preferred to use horses could of course do so. Iron pavements could doubtless be made that would be quite as serviceable as the present stone blocks. The subject presents a fine opportunity for students of electricity to exercise their head gear.—*Scientific American*.

CURIOUS FACT.—If a small bit of camphor is laid upon water, it begins turning and moving about with great rapidity. If a few grains of lycopodium or other light powder have been previously scattered on the water, they are drawn toward the camphor by eddies in an inverse direction. These phenomena were observed in 1748 by Romieu. Cassamajor has, says *Les Mondes*, resumed the study of the question and adopted the views of Romieu. He instances the following crucial experiment: At the same time that the bits of camphor are thrown upon the water, insert a glass rod which has been rubbed with flannel; the motion immediately stops. If the electricity is removed from the rod by rubbing it with tinfoil, it loses its power of checking the eddies.

REMOVAL OF STRONG ODORS FROM THE HANDS. Ground mustard, mixed with a little water, is an excellent agent for cleansing the hands after handling odorous substances, such as cod-liver oil, musk, valerianic acid and its salts. Scale pans and vessels may also be readily freed from odor by the same method. A. Huber states that all oily seeds, when powdered, will answer this purpose. In the case of almonds and mustard, the development of ethereal oil, under the influence of water, may perhaps be an additional help to destroy foreign odors. The author mentions that the smell of carboric acid may be removed by rubbing the hands with damp flax-seed meal, and that cod-liver oil bottles may be cleansed with a little of the same, or olive oil.—*Druggists' Circular*.

TO REMOVE INK FROM DRESS GOODS.—Oxalic acid is considered one of the best agents for this purpose. Dissolve 10 cents' worth in a pint of soft water; dip the stained spots in it quickly, and then into clear water, and rub well; repeat the process until the stains are removed. If the goods remain in the acid, the texture will be destroyed. The skin of the hands is unpleasantly affected if brought into frequent contact with a strong solution; care should be taken to dip only the spots into this liquid. If the color of the dress is affected, mix with warm water and wet with a dilute solution of ammonia, which will restore the original color. Ink stains on table covers can be removed in the same way.

TO "dry" linseed oil without boiling it, add to old oil about two per cent. of borate of manganese, and heat in water bath to at most 225° Fahr., stirring well.

TO REMOVE ink stains from linen, with a clean rag or sponge rub the soiled spot with lemon juice in which has been dissolved a small quantity of salt.

OSTRICH feathers may be bleached by exposing them to the light of the sun in an atmosphere saturated with the vapors of benzine, turpentine or petroleum.

ARTIFICIAL WINES.—The ravages of the phylloxera have greatly increased the demand for "artificial wines" and brandies, or those made from raisins. E. Martin undertakes the defence of these products, and says that chemical analysis can show no difference between them and those which are made from fresh grapes. He states, however, that it is better to add an equal portion of fresh grapes, so as to quicken the fermentation which has been rendered sluggish by drying. When this is done, he defies the most skillful connoisseur to detect two specimens of artificial wines among eight others of natural wines.—*Chron. Indust.*

TO TAKE BRUISES out of furniture, wet the part with warm water; double a piece of brown paper five or six times, soak it in the warm water, and lay it on the place; apply on that a warm, but not hot, flat-iron, till the moisture is evaporated. If the bruise be not gone, repeat the process. After two or three applications, the dent or bruise will be raised to the surface. If the bruise be small, merely soak it with warm water, and hold a red-hot iron near the surface, keeping the surface continually wet—the bruise will soon disappear.

A NEW BREED OF WHALES.—A whaling captain, lately returned from the arctic seas, declares that a new breed of whales have made their appearance in those waters. They are supposed to have emigrated from the open sea at the Poles. The skipper describes them as very much larger than the old whales, and very gentle and confiding. In former years, when a whale was harpooned the rest of the herd threw up their flukes and made off. The new breed do not seem to mind in the least the capture of one of their number.—*Ex.*

TEA TWO HUNDRED YEARS AGO.—The London Gazette of December 16, 1680, has the following: "These are to give notice to persons of quality that a small parcel of most excellent tea is by accident fallen into the hands of a private person to be sold; but, that none may be disappointed, the lowest price is 30 shillings a pound, and not any to be sold under a pound weight, for which they are desired to bring a convenient box. Inquire at Mr. Thomas Eagle's, at the King's Head, in St James' Market."

ASH OR HICKORY FOR TOOL HANDLES.—A correspondent of the *Wheelwright and Blacksmith* wishes to know the relative value of "maiden ash" and hickory for tool handles, and also what "maiden ash" is. That journal, in reply, says that "maiden ash" is an ash sapling that has never been lopped; it is no better than hickory.

ANY fibrous material can be stuck to metal, whether iron or other metal, by an amalgam composed of good glue dissolved in hot vinegar with one-third of its volume of white pine pitch, also hot. This composition, it is said, will give a sure and certain result.

M. DRONER has patented in Germany a process for rendering bronze as malleable as copper. About one per cent. of mercury is added to the tin in a warm state, and this is then mixed with the melted copper.

DILUTE acetic acid has been successfully used by Dr. Ambuehl in extracting lead from alloys of tin and lead. He found Banca tin to be quite free from lead and English bar tin to contain only a slight trace.

GOOD HEALTH.

What to Do in Cases of Diphtheria.

In the first place, as diphtheria is a contagious disease, and under certain circumstances not entirely known, very highly so, it is important that all practical means should be taken to separate the sick from the well. As it is also infectious, woolen clothes, carpets, curtains, hangings, etc., should be avoided in the sick room, and only such material used as can be readily washed.

All cloths, when removed from the patient, should be at once placed in hot water. Pocket-handkerchiefs should be laid aside, and in their stead soft pieces of linen or cotton cloth should be used, and at once burned.

Disinfectants should always be placed in the vessels containing the expectoration, and may be used somewhat freely in the sick room; those being especially useful which destroy bad odors without causing others (nitrate of lead, chloride of zinc, etc.) In schools there should be especial supervision, as the disease is often so mild in its early stages as not to attract common attention; and no child should be allowed to attend school from an infected house, until allowed to do so by a competent physician. In the case of young children, all reasonable care should be taken to prevent undue exposure to the cold.

Pure water for drinking should be used, avoiding contaminated sources of supply; ventilation should be insisted on, and the local drainage must be carefully attended to. Privies and cesspools, where they exist, should be frequently emptied and disinfected; slop water should not be allowed to soak into the surface of the ground near dwelling-houses, and the cellars should be kept dry and sweet.

In all cases of diphtheria fully as great care should be taken in disinfecting the sick room, after use, as in scarlet fever. After a death from diphtheria, the clothing disused should be

burned or exposed to nearly or quite a heat of boiling water. The body should be placed as early as practicable in the coffin, with disinfectants, and the coffin should be tightly closed. Children, at least, and better adults also in most cases, should not attend a funeral from a house in which a death from diphtheria has occurred. But, with suitable precautions, it is not necessary that the funeral should be private, provided the corpse be not in any way exposed.

Although it is not at present possible to remove at once all sources of epidemic disease, yet the frequent visitation of such diseases, and especially its continued prevalences, may be taken as sufficient evidence of insanitary surroundings, and of sources of sickness to a certain extent preventable.

It should be distinctly understood that no amount of artificial "disinfection" can ever take the place of pure air, good water and proper drainage, which cannot be gained without prompt and efficient removal of all filth, whether from slaughter houses, etc., public buildings, crowded tenements or private residences.—*From the Circular of the Massachusetts State Board of Health.*

The Use of Pain.

The power which rules the universe, this great tender power, uses pain as a signal of danger. Just, generous, beautiful Nature never strikes a foul blow; never attacks us behind our backs; never digs pitfalls, or lays ambuscades; never wears a smile upon her face when there is vengeance in her heart. Patiently she teaches us her laws; plainly she writes her warnings; tenderly she graduates their force. Long before the fierce red danger-light of pain is flashed, she pleads with us—as though for her own sake, not ours—to be merciful to ourselves, and to each other. She makes the overworked brain to wander from the subject of its labors. She turns the over-indulged body against the delights of yesterday. These are her caution signals, "Go slow." She stands in the filthy courts and alleys that we pass daily, and beckons us to enter and realize with our senses what we allow to exist in the midst of the culture of which we brag. And what do we do for ourselves? We ply whip and spur on the jaded brain as though it were a jibing horse—force it back into the road which leads to madness and go on full gallop. We drug the rebellious body with stimulants; we hide the signal and think we have escaped the danger, and are very festive before night. We turn aside, as the Pharisee did of old, and pass on the other side with our bandkerchief to our nose. At last, having broken Nature's laws and disregarded her warnings, forth she comes—drums beating, colors flying—right in front to punish us. Then we go down on our knees and whimper about it having pleased God Almighty to send this affliction upon us, and pray him to work a miracle in order to reverse the natural consequences of our disobedience, or save us from the trouble of doing our duty. In other words, we put our finger in the fire and beg that it may not hurt.—*Ex.*

SKIN GRAFTING FROM THE DEAD.—Dr. J. H. Girdner, house surgeon at Bellevue Hospital, has obtained some remarkable and valuable results in skin grafting during the past year. One patient who required such treatment refused to furnish grafts from his own arms or body, owing to the pain involved; and, unwilling to ask another to subject himself to a pain which the person to be benefited was unwilling to submit to, Dr. Girdner tried the experiment of taking skin grafts from a corpse. The doctor says: "I cut a piece of skin from a patient who died in the wards a few hours before, first taking care to inquire whether the cause of death was due to a poisonous disease or not. I then cut the cuticle into small pieces, which I laid on the granulated surface of the ulcers, and hand-aged the leg up very firmly. In three days the graft began to show signs of life, a perfect union having taken place, and in a week a splendid skin, smooth and elastic, had grown over the ulcerated part, making a complete cure and leaving no scar behind. Since that time I have treated upward of 50 cases with invariably success. I have grafted the skin of an Irishman on a negro, and I have grafted the skin of a negro on an Irishman with ease. In both cases the skin lost its original color and changed its hue to suit the wearer."

THE EFFECT OF ELECTRIC LIGHT UPON THE EYES.—A Russian correspondent of the Paris *Temps* speaks as follows as regards this matter: "Kronstadt was the first city in Russia where the electric light was introduced into public and private buildings, and it has also been the first to discover its inconveniences. Diseases of the eyes having become more frequent, the attention of the government and of oculists has been turned towards the means of preventing these sad effects. The officer commanding the Black sea fleet has reported several cases of the sudden loss of sight caused by the dazzling of these lights used on board, and having an illuminating power of 14,000 candles. Dr. Lohinski, a specialist and an authority in these matters, has investigated this question, and finds that the use of blue glasses is the best protection against the Jablochhoff light. Next to this comes the gray glasses, and then the violet. Clear yellow tints, and also red, should be carefully avoided, for instead of decreasing the ill effects of the electric light upon the eye, these colors render it more injurious."

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The Week.

Business continues dull in the city, and from all appearances is likely to remain so for several weeks. It is the seasonable condition. After a brief time the general vacation will be over, and men will resume their enterprises with renewed vigor, spirit and intelligence. The condition of business in the State is satisfactory, and both farmer and miner are likely to increase their respective products greatly beyond the yield of last year. The outlook for the vineyardists is especially cheering.

The interest in the condition of the Comstock increases. Operations in the great mines at the north end are followed with intelligent anxiety. The pump on the 2500 of the Union Con. is said to be the key to the north end; for it will admit of the draining of the Sierra Nevada incline and permit the connection of the northwest drift on the 2500 of the Union with the station of the incline; in fine, it will "loosen the bands which bind Sierra Nevada and prevent cross-cutting on the 2400 north, and will permit the opening of the 2500 of Union." Savage is erecting bulkheads against the inflow of water; and towards the south they are ventilating the mines on a magnificent scale.

The Chamber of Commerce has adopted resolutions calling the attention of our Congressional delegation to the importance of continuing the geographical and topographical surveys of the States and Territories west of the 100th meridian, and urging them to vote for liberal appropriations for prosecuting the same. And also that the members be invited to work actively to secure an appropriation for a marine survey of the entire coast, and the early issuance of charts and maps of the same. This last resolution has special reference to the coast of Alaska.

Since our last issue the reports from the outside mines—notably those of Bodie and Columbus districts—have been meager, but on the whole, quite encouraging.

A Distinguished Engineer.

There arrived in this State a few days since a citizen of shining mark—Mr. James B. Eads, one of the most distinguished engineers of the country. He has already achieved a reputation as wide as the world as the most successful manager of great and difficult engineering projects. As an engineer, Mr. Eads has long since become conspicuous for the seeming audacity of his projects, no less than for the remarkable constructive talent which has enabled him to carry them to successful and brilliant conclusion. There is no doubt that the skillful engineering management of the remarkable bridge at St. Louis was due chiefly to Mr. Eads. For in a paper recently read before the British Institute of Civil Engineers, on the "Recent Progress in Engineering," the first place is assigned to that great work as the engineering feat accomplished during the last 50 years.

In tracing briefly the brilliant career of Mr. Eads we summarize the very intelligent account of his achievements from the *Sacramento Record-Union*. Mr. Eads became familiar with the Ohio and the Mississippi rivers when in his early years he was engaged in running steamboats on their waters. It is said that he was first a steamboat clerk, a pilot and then a master. Subsequently he became an owner of boats, a manager of works for a large heating and contracting company, and while thus engaged in superintending the raising of sunken vessels, the construction of wharves and other river works, he was afforded special opportunities for studying the laws governing the science of hydraulics as applicable to the improvement of rivers, and daily presented to view by the flow of the Father of Waters. During the war of the rebellion he became prominent as a contractor and builder of ironclad vessels, and showed his ability in successfully conducting various other engineering enterprises.

In his second great engineering work—that of improving the channel at the mouth of the Mississippi—Mr. Eads achieved high credit, mainly for having persistently advocated the jetty system as the most efficient method of opening a deep navigable mouth to the river. He did this in the face of the most strenuous opposition on the part of other engineers, who declared that the effect of jetties in obtaining and preserving a deep-water channel in this instance would not be favorable, and that the proper method was to construct a canal, with locks, as an artificial entrance to the great river. Mr. Eads not only indicated the true means of improving the outlet of the Mississippi, but with remarkable energy and intelligence he secured capital to carry out his plan and procured the passage of a bill through Congress, pledging the Government to pay certain sums upon the accomplishment of certain desired results respecting a deep-water channel. Time has proved the jetty system, as applied to the mouth of the Mississippi, to be a splendid success; for, to use Mr. Eads' own words, "the last survey made the channel deeper than ever before, and all doubt of the success of the jetties has been removed." The use of jetties, as a means of contracting the flow of river currents and forcing the scouring out of channels through shallows or bars, is an old plan well known to engineers; but it is the nice judgment which perceives the conditions under which that method may be applied that ensures success. The large practical experience of Mr. Eads with the peculiarities of the Mississippi fitted him to deal with the difficult project he undertook and achieved so successfully.

The presence of this successful engineer in California is full of interest. It is well known that the law of the State, passed in 1878, creating the office of State Engineer, provided for the appointment of two consulting engineers, who were to advise with the State Engineer upon plans for the improvements of rivers and kindred matters. Gen. Alexander and Col. Mendell were appointed consulting engineers; but shortly afterwards Gen. Alexander died, and the vacant place was, by the advice of those most deeply interested, tendered to Mr. Eads. Now that the State Engineer is assisted by such eminent talent—Mr. Eads' mind especially must be a storehouse of facts relating to such matters—we may confidently look for plans which will lead to the speedy opening of our rivers and the practical settlement of the vexed question of drainage. Such a consummation is earnestly desired.

DEMAND FOR LOCOMOTIVES.—We learn from the *Railroad Gazette* that the Baldwin Locomotive Works, Philadelphia, are now employing 2,750 men, all working as full time as the weather will permit. During the past half year they have turned out the largest amount of work ever done in the same time. Upward of 260 locomotives have been sent out in six months, and the orders already entered warrant the assertion that the last half of the year will show a still further increase on what they have hitherto been able to accomplish. During August they will ship 12 locomotives to Australia, besides street motors. They have quite a number of motors under way, including 4 for Brooklyn, 6 for San Francisco and several other cities. Indications seem to show that in the immediate future there will be a larger business in railway equipments than has ever been known.

Caving of the Hudson River Tunnel.

On the morning of the 21st inst., owing to carelessness in adjusting the air-lock, the caisson leading to the entrance of the tunnel at Jersey City caved in, carrying with it an immense quantity of earth; the water from the river flowed in and 20 of the workmen were drowned. The official report of the disaster says:

Twenty-eight men were in the tunnel when the accident occurred, of whom 8 escaped and 20 were drowned. The cause given is that probably the men did not watch the brick wall of the working shafts as closely as they should. The accident will stop work for three weeks. No other points in the official report not already covered. When eight men had gotten out, another of the workmen, in trying to pass through the door leading from the air-lock into the temporary chamber of the tunnel, was jammed in the doorway, and despite the efforts of those ahead, could not be brought out, as the door closed upon him and held him fast. Peter Woodland, Assistant Superintendent, told the men to try and get out, and when the ninth man was fastened in the doorway, he called out to those who had escaped, telling them to hurry up and try to get assistance to help the rest and himself, saying he would stay and make every effort to get the rest out, and if it were not possible, then those escaping must try to get the rest and himself out alive. Following is the complete list of the saved: Thomas Brady, B. McGovern, A. J. Moline, Thomas Cummings, Chris. Hansen, J. Van Nostrand, John Doyle, James Hayes.

The following graphic account of the disaster is given by J. Van Nostrand, one of the rescued workmen: The main shaft is 60 ft. deep, and from the bottom of this shaft the entrance to the tunnel is effected through a cylindrical barrel 6 ft. in diameter and 14 ft. in length. This is called an air-lock, and serves to preserve the density of the atmosphere of the tunnel, which, in turn, is secured by the forcing of air through pipes from the pumps. There is a door in each end of the air-lock. They both open inward. At each side of the doors are round windows of thick glass, through which, from the outside of the air-lock, a view can be gained of the work and the workmen inside the tunnel. There were 23 men at work at the tunnel. They went on at 12 o'clock last night, for the eight-hour shift. I was at work near the east end of the lock, and in the west end of the tunnel, at about 4:30 o'clock, I heard bolts snap and braces give way. At the same time I felt a rush of air on my face. I started back with seven of the men who were near me, and ran into the lock. The air-pressure crowded the door shut at the east end. At first, it was locked by a joist, which we pulled out, and then the door slammed to. Through the dead-eyes we could see the men inside the tunnel. The water was fast rushing. Peter Woodland, Assistant Superintendent, stood at the door outside the lock, which was stationary. It would not move with us without knocking out the dead-eyes. This would be fatal to the men outside, as the water would rush in and drown the men in an instant. Woodland knew this, but stood at the door. His face was ghastly white and he realized the terrible danger. He said to me, "Tom, quick; bust the dead-eyes and do what you can for us." I knew that it was death to us all if I did not, so I obeyed the order. As the glass broke, the air rushed in, and the lock shot out in the main shaft, leaving the men to drown, as the space occupied by the shaft filled with water in an instant. We were wholly stripped of our clothes when we crawled out. I heard a rush of water at our back. It filled in fast, but the obstruction kept it back long enough for us to escape from the main shaft. It was all we could do to save ourselves. Woodland was standing in water up to his waist when I saw him. It was a sure death, and I had to knock out the dead-eyes as I told you. He knew as well as I that it was all over with them. I shall never forget the look on his face, or the sound of his voice, as he told us to save ourselves, though the very act was to insure his death.

In accounting for the disaster, officers of the Tunnel Co. say that the workmen in coming through the air-lock must have been criminally reckless in leaving both doors open at the same time, by which the compressed air was permitted to escape. The compressed air serves a double purpose, namely, to keep the water out and to support the roof, so that when it escaped a catastrophe was inevitable.

The dispatches say the workmen were busily engaged during the afternoon of the 21st inst. in fitting up a powerful pump for the purpose of drawing off the water from the well-like structure, and also for drawing water out of the tunnel, which is filled to the extreme limit; as has been ascertained by engineers by the test of attempting to force compressed air into the cavity. The water in the shaft has fallen about 10 ft. since morning in consequence of the receding of the tide. Every now and then the surface in the center would be disturbed by numerous air bubbles, and at times would appear as if boiling. This appearance, it is said, is due to the fact that some of the earth or masonry is falling constantly within the tunnel, and the displacing air produced this effect.

Engineers and officials say it is impossible for any of the imprisoned workmen to be alive, as the water within the whole length of the tunnel is up to the roof, and even above it. The la-

borers who are making an excavation west of the shaft will not, however, cease their labors to get at where the bodies are supposed to be; but it is impossible to force any air into the tunnel, as all which has been forced in, so far, has escaped through the shaft, in which it has made the water leap up two or three ft. above the surface.

Academy of Sciences.

The regular semi-monthly meeting of the Academy was held on Monday evening last, with Mr. C. Wolcott Brooks in the chair.

A collection of new fishes from Monterey bay was presented by W. N. Lockington, on behalf of himself and from Prof. D. S. Jordan. A new flounder, found off Tacoma, Washington Territory, and a species of bull-head fish, were also presented.

Mr. Lockington read a paper on "The Fish of the Pacific Coast Waters," which was interspersed with very interesting comments on the fishes presented, and gave a synoptical statement of the very important and thorough investigation now being prosecuted by Prof. Jordan on behalf of the United States Census Fish Commission. He reported that

Forty New Species of Fish
Had been discovered upon our coast, many of which would furnish rich material for future description. As our adventurous fishermen are resorting to new grounds, in deeper water, their more recent catches include new species, not previously encountered when fishing in shallower water and nearer shore. He said that it is now ascertained that upon our coast there are known to be 240 species of marine fishes, 40 to 50 fresh water varieties of fish, and some seven or eight kinds recently introduced from the Atlantic coast by portage across the continent, such as Eastern shad, king carp, cat-fish, etc.

He described a sun-fish seven ft. long, and about as high as long, occasionally found in Monterey bay, a specimen of which—fourteen inches long—is now at Woodward's Gardens. Also, a large globe fish, able to inflate itself and float off before the wind at a rapid rate, when tired of swimming.

Twenty-one Species of Flat Fishes,
Resembling flounders in shape, are found on the coast. The halibut is largest, and the haddock is found farther south. The next in size is sold as turbot, and the balance is mostly classed by fishermen as soles. The cods of this coast are unlike those found East, the mouth being differently formed. The so-called rock-cod and ordinary codfish are unlike, and belong to entirely different tribes of fish. Of the 25 varieties of rock-cod on this coast, there is great variety of form, but constant of color. Several species of the true codfish are found around the coast of Alaska and its adjacent islands, where they are as plenty as in corresponding locations upon the Atlantic, but none are found south of Puget sound. They are caught and salted for use in this market, and the industry, which is a growing one, is great as the present demand for consumption will bear.

The Salmon Species,
So well known to us, were described, and so mackerel, several varieties of which are found in the Pacific, but being fond of warm waters, they rarely venture north of the sub-tropical regions of Point Conception. Occasionally a few stray into Monterey bay, but none ever venture into the band of cold water that stretches along the coast abreast of San Francisco bay. Monterey, being middle ground, has the richest supply and variety of fishes of any point on our coast, being resorted to by herons from both northern and southern waters. There is occasionally found at Catalina island a rose mackerel, a Spanish mackerel and a few real, true mackerel, in addition to the albacore, which are plenty.

Mr. Lockington explains that the reason for finding so many new species along this coast was because fishermen have been seeking new deep-water fishing, and have, therefore, and so many fish which have hitherto been strangers to our market. The speaker referred to the whiting in particular, which was until recently a rarity; but latterly, it is seen in abundance at the fish market, and is of a larger species than that formerly sold. A small "tope" (*Galeomus galeus*) was presented, and the speaker explained that it was abundant along the coast, particularly near San Luis Obispo. It has hitherto been believed to be entirely confined to European waters; but it is a source of revenue to the Chinese fishermen of San Luis, who catch these eels, from six to 12 ft. long, and extract the oil, amounting to 12 pounds in a large fish, while the fins are preserved and sent to China. The speaker mentioned another variety of the finny tribe, commonly known in Europe as the king of the herrings. Prof. Jordan has ascertained that this voracious sea monster, which is seldom seen out of the deep water of the ocean, exists in our waters. It eats quantities of herrings, living almost entirely upon them, hence its name. The speaker concluded by saying that Monterey bay was the richest collection point on this coast, as it seemed to be the dividing point between the southern and the northern waters. Here all the species of the northern seas and all of the south are found.

A New Piscatorial Emigrant.

Mr. Keeps, of Alameda, presented what is popularly known as a king crab, the only one ever found on this coast. Its presence here was said to have resulted from its transportation, while very small, across the continent with Eastern oysters, that had been brought here and transplanted, the crab having been found near the San Leandro draw-bridge, and not far from the oyster beds. The king crab greatly resembles the ancient form of trilobites, especially when young, and is the most ancient living species of the crustacean order.

A Peculiar Fish.

Prof. Jordan reports having caught a large fish, in whose stomach he found another fish, just swallowed, inside of which he found still another smaller one, like a nest of boxes three deep, beautifully illustrating how the larger fish swallow the smaller.

Mr. Lockington's remarks were exceedingly interesting, and are of value to scientists and commercial men, as well as to epicures.

A large number of valuable works, among them the recent Smithsonian Institute publications, and also the usual scientific exchanges, were presented and added to the library.

A Hillside Scene in China.

Our illustration presents a scene in the Bohea tea district, of China. We introduce it as illustrative of the system of hillside culture, which prevails in that part of the world. Now that the utilization of our elevated lands is being urged on the ground of their cheapness, and their adaptation to certain growths of fruit, it is interesting to note an illustration of actual work on similar elevations. All are more or less familiar with the cultivation of hillside in Europe for the production of grapes, olives and other fruits, and it is interesting to face the other way and behold hillside ranches in China. The time will doubtless come when our own hillside, with their peerless climate and pure air, and their fitness for certain uses, will be peopled with an industrious and intelligent population. It is an end to be hoped for, and the tendency in that direction at the present time is worthy of all encouragement.

NO "ROYAL ROAD" IN MINING.—Several weeks ago we received from a writer at Volcano, Amador county, an account of a wonderful instrument discovered by a Dr. Wells for finding veins of gold and silver hidden ever so deep beneath the surface. "This magnet," as the writer calls the instrument, "is suspended by a cord from the hand. If there is a gold-bearing ledge underground, the magnet makes a rotary motion, the circle described being large or small, according to the richness of the rock." The same magnet indicates the presence of silver ore by a "vibratory motion." After reading this brief description, we are convinced that Dr. Wells' magnet would lead to success in Gerolstein, but we are doubtful about the result among the hard-headed miners of this coast. What would our correspondent do if one offered to sell him, let us say, a receipt for the philosopher's stone? We hope he would keep his money in his pocket. There's no "royal road" to the gold and silver imbedded in the earth. For us, the pick against the "magnet" all the time. That ancient and useful tool, especially when guided by the best experience, which is simply science, will certainly open the way to the quartz vein. As there is no attempt to explain the wonderful properties ascribed to this magnet, we are left to infer that it possesses an inherent gold-and-silver finding quality. Dr. Wells does not need to sell his magnets. There lie the ground from Arizona to Dakota, holding doubtless countless veins of gold and silver; and if he lacks or desires either or both, let him rotate and vibrate his "magnet" until he becomes a ten-fold millionaire.

NEWS FROM THE "CORWIN."—The U. S. revenue cutter *Corwin*, which some weeks since was dispatched to the relief of the exploring steamer *Jeannette*, as well as the ice-bound whalers, arrived at Ounalaska on the 3d of June, after a boisterous passage of 12 days. The *Chronicle* gives the following extract from a private letter written by one of the *Corwin's* officers on the 7th of June: "We have 100 tons of coal on board now, and will sail to-morrow morning for the islands and the north. We hope to be at the straits by the 15th inst., and will push through into the Arctic on the first opening of the ice. We are all prepared for a winter in the Arctic, having enough stores on board to last all hands 14 months. At St. Michael we will procure two dog teams and add a quantity of salt fish to our provisions. The indications are favorable for an early opening in the ice. The past winter was mild and the spring stormy. Heavy winds are said to break the ice and open the Arctic earlier than clear, fine weather, which is usually accompanied by a very low temperature."

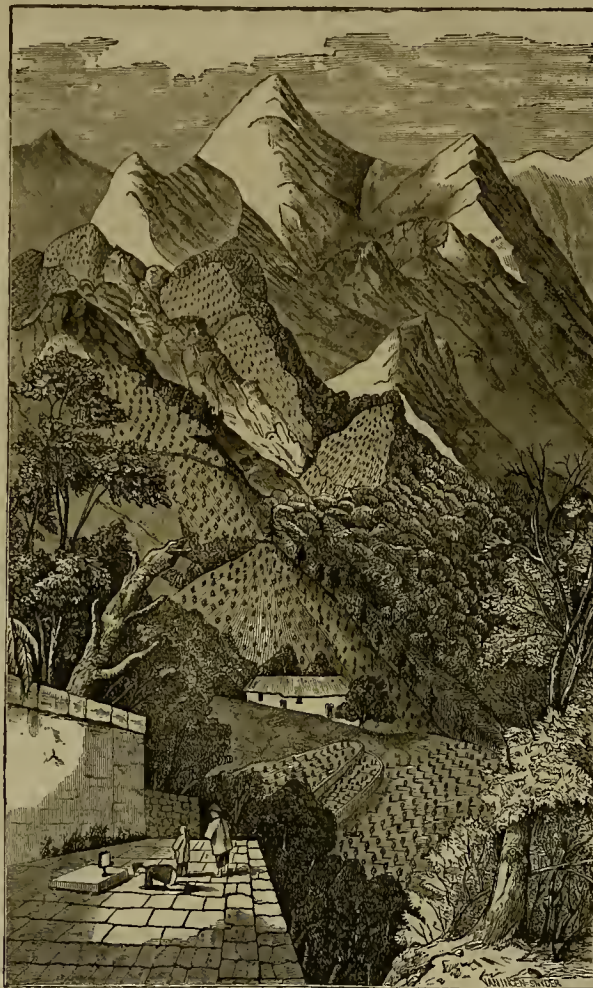
MINING NEWS ASSOCIATION.—An association for this object is the latest thing in New York. It is organized for the purpose of receiving the latest and most authentic telegraphic reports of million shipments, new strikes and other important matters pertaining to the leading districts and mining centers of the country.

Melbourne Industrial Exhibition.

In relation to the approaching International exhibition at Melbourne, Mr. Thomas B. Pickering, who is the accredited Commissioner of the United States, has furnished this account to the *Alta*:

There are several disadvantages to be contended against. Primarily, of course, the enormous distance between any port in this country and the port of destination for goods. Again, this is the first International exhibition abroad, of any importance, for which our Congress has made no appropriation for the transportation of goods, and a third difficulty is the extraordinary business revival among the Eastern manufacturers. It has placed them in such a position as to render it difficult for them to send exhibits to a foreign exhibition. Notwithstanding these circumstances there will be about 400 exhibitors in the American department at Melbourne, and the wares to be exhibited have been selected principally on account of their adaptability to the wants of the Australian colonies. The distance is too great, and the expense too heavy, to send goods merely to show. Our main exhibits will be of agricultural implements and tools, railroad appliances, and silver-plated wares. Among the largest exhibitors are the

ucts to the value of \$92,072,500; the U. S., during the same period, having sent but \$7,000,000 worth of her products and manufactures. These figures demonstrate what business awaits us there if we only introduce our goods and adapt them to the requirements. The same class of goods that were required on this coast, say 25 years ago, for the development of this country, are now needed in the Australian colonies, which are growing with a wonderful rapidity. American exhibitors need not fear that a local prejudice will stand in the way of their obtaining merited awards. At the Sydney exhibition, of 300 American exhibitors, nearly 200 received awards. Exhibitors are charged nothing for space; their only expense is the transportation and installation of the goods, and the U. S. Commissioner will look after and exercise a general supervision over such goods as have no special agents or representatives in charge of them. The Pacific Mail Company has very liberally offered to return to this U. S., free of cost, all such goods as remain unsold at the close of the exhibition. Most of the goods from the Eastern States are being transported by sailing vessels direct to Melbourne, from New York or Boston. Such goods as have not already been forwarded, must necessarily be sent by steamer, and for this purpose special rates have been secured by the Morris European Express, of 50 Broadway, New York city, who also attend to



SCENE IN THE BOHEA TEA DISTRICT OF CHINA.

Ames' Agricultural Co., the Middleton Plate Co., Simpson, Hall, Miller & Co., and Manning, Bowman & Co. Edward Miller & Co. will make a handsome exhibit of lamps, lanterns and bronzes, and the Bradley & Hubbard Man'g Co. of lamps and chandeliers. The American Watch Co., of Waltham, Mass., who received the highest award for American watches at the recent Sydney exhibition, will again be well to the front at Melbourne. The State of Connecticut is making a special collective exhibit of the numerous industries of the State, in a business and systematic arrangement. The most promising exhibitors from this coast are the San Jose Fruit Packing Co. and the Oregon Packing Co., of Portland, the latter sending a fine collection of canned salmon. We have ample space for a magnificent display, having 60,000 square ft., and the American section is admirably located, being directly opposite France and Germany, on the main aisle. Here on the Pacific coast, where our manufacturers and producers are in easy and direct communication with Australia, this exhibition will undoubtedly prove of immense benefit to those who take advantage of this opportunity to present their goods upon the Australian market.

A few statistics may serve to show the importance of the trade of Australia. In the year 1876, the latest date for which the full returns are available, the commerce of Australia amounted to a total of \$462,950,000, the imports of Victoria, the colony of which Melbourne is the capital, being \$78,520,000, and the exports \$70,970,000. In the same year Australia took British manufactures and prod-

ucts to the value of \$92,072,500; the U. S., during the same period, having sent but \$7,000,000 worth of her products and manufactures. These figures demonstrate what business awaits us there if we only introduce our goods and adapt them to the requirements. The same class of goods that were required on this coast, say 25 years ago, for the development of this country, are now needed in the Australian colonies, which are growing with a wonderful rapidity. American exhibitors need not fear that a local prejudice will stand in the way of their obtaining merited awards. At the Sydney exhibition, of 300 American exhibitors, nearly 200 received awards. Exhibitors are charged nothing for space; their only expense is the transportation and installation of the goods, and the U. S. Commissioner will look after and exercise a general supervision over such goods as have no special agents or representatives in charge of them. The Pacific Mail Company has very liberally offered to return to this U. S., free of cost, all such goods as remain unsold at the close of the exhibition. Most of the goods from the Eastern States are being transported by sailing vessels direct to Melbourne, from New York or Boston. Such goods as have not already been forwarded, must necessarily be sent by steamer, and for this purpose special rates have been secured by the Morris European Express, of 50 Broadway, New York city, who also attend to

the speedy forwarding to Melbourne of belated exhibits. During my stay here (which will be until the next Australian steamer, on Ang. 1st), I am anxious to meet and confer with intending exhibitors, and my headquarters will be with H. A. Gregory & Co., Nos. 2 and 2½ California St. The Melbourne exhibition will open on the 1st of Oct., and will remain open for six months—a peculiarity being that it will be the first International exhibition to keep open in the evenings. The Commissioner-General is Mr. George Collins Levy, of Melbourne.

Mr. Pickering has had great practical experience in the matter of exhibitions. He represented the U. S. at the Paris exposition in 1867; at Vienna in 1873, and represented the State of Connecticut at the Centennial. At the Paris exposition of 1878, he was Superintendent of the American machinery and agricultural department, under Commissioner-General Richard C. McCormick, who, Mr. Pickering says, was the most efficient Commissioner the U. S. have ever sent to an International exhibition. In 1873, Mr. Pickering received from the Emperor of Austria the decoration of the Order of Franz Josef, and in 1878 he received from the French government the Cross of the Legion of Honor.

Letters from the Comstock.—No. 4.

EDITORS PRESS:—The Savage men have had their election, and Gen. Williams will be at the helm for another year. When Jim Keene went in several years ago, he promised the stockholders that there would be no more assessments, yet everyone recalls how regularly these calls for coin came. Ever since the water broke in from the west country, the Savage has been an utterly useless piece of property. It has been a rapacious devourer of wood, and whole forests have been swallowed up by the insatiable furnaces, which really amounted to so much money thrown away. There is but one way to work the Savage, and that is through the combination shaft. Let the water come in from the west country until it rises to its level in the shaft, or bulkhead the drifts; then abandon the present workings and use the combination shaft. With a map of the old workings constantly before him, a superintendent need not tap any of the present drifts or crosscuts, and much unexplored country could be prospected. Unless this can be done there is very little use of keeping the pumps running, for no matter how low the water is, the heated vapors rising from the pump will always render the place disadvantageous to work in, and miners must be salamanders who can live there now. It is well known that men have died there from the heat of the incline. Frank Oshiston warned the management of the water before they struck it, and yet they went right ahead until they rushed upon their own destruction. The Hale & Norcross and Gould & Curry might also be worked upon the plan I have proposed. It is not a new idea. The superintendents have talked of it frequently, but it is not a popular idea. It would throw a good many fat-salaried men out of employment, and that is why it is not popular. No Comstock paper has ever dared to advocate it, and the workmen, who know where their bread is buttered, never think of endorsing it. The fact, however, remains the same, that the three mines named can never be successfully worked until they are closed down at their shaft and worked through the combination shaft. A good many miners have held on to Savage, because only a few hours before the rush of water, some miners working in the east drifts came upon ore, and they confided the secret to their comrades. It is not hard to find miners in Virginia, who believe that there is ore yet to be uncovered in Savage, and those who so believed have held on to the stock with a grip that even the regularity of assessments cannot shake off. Here is where many hold one of Coll Deane's three bonanzas lies, but for further information you must ask Coll himself.

The report of the Union Con. recently made contains the statement that the bulk of the ore body lies south of the Sierra Nevada line. Since the line was shifted to suit the convenience of the manipulators, it has been the policy of the inside to bolster up Union and depreciate Sierra Nevada. Yet it is a well-known fact that the bonanza firm is loaded down with the latter stock. They were heavy purchasers at \$200 a share, and despite the way in which the mines have been handled Mackay pins his faith in the unexplored region north of the Union line. He believes the Comstock to be shaped like a codfish, with his big head lying up by the Geiger grade, and his tail in American Flat. Speaking of the tail brings one down to the poor little despised Quinn, owned by Dr. Bronson. The mine is getting to be quite prominent of late, and there is no doubt but that the owners have found a mighty good thing. It is generally believed that there is lots more in the district. There are a good many experienced mining men who hold that the Comstock pinches out near Gold Hill; is poor and thin at American Flat, and then begins to bulge again in the Quinn vicinity. The Lady Brynn men have concluded to sell their machinery, and it is probable that a good many more mines in the Flowery district will follow suit. The only ore in that section is base, and the rich body found in the North Bonanza can only be mined with difficulty, and has as yet been of no use to the stockholders.

The Union pump is advertised to start up on Wednesday, which means, of course, any time this week.

HAND DRILL.

Virginia City, July 21, 1880.

ERUPTION OF AN OLD VOLCANO.—An account from Escuintla, Guatemala, of June 29th, gives some particulars of the sudden eruption of the volcano Fuego de Antigua, which had been quiescent for the past 19 years, and is the volcano that destroyed the city of Antigua, the old capital of Guatemala. The account says that a column of flame shot up to the apparent height of 1,000 ft. and imparted to the sky a bright yellow tint. The crater, which was fully half a mile wide, seemed to labor in discharging the dense volume of ashes, flame and sulphurous smoke. As the eruption occurred on a saint's day, the people of Escuintla regarded the eruption of the volcano as a warning and they all repaired to the church where the service began at 5 o'clock in the morning. An hour later the volcano was not visible on account of the smoke which enveloped it, but the flames at the top were plainly visible. At 8:30 o'clock the ashes and stones began to fall into the river at the base of the volcano and caused columns of steam to rise. The volcano and the surrounding hills were inhabited by Indians, and unless they had been forewarned the loss of life among them must have been great.

The Freeland Concentration Works.

In our last issue we gave a brief description of the Freeland mine at Idaho Springs, Clear Creek county, Colorado; we now give a particular account of its reduction works, and its method of cheap concentration, from a pamphlet published by Aaron Frost:

This mill has been in operation about eight months, and is eminently successful, the only drawback being a lack of sufficient capacity to treat more than one-third of the ore which could be taken from the mine. The capacity is 115 tons per day. The dimensions of the building are as follows: jig room, 75x62 ft.; ore floor, 48x35; engine and boiler floor, 35x43. The dumping floor is 55 feet from the mouth of the Freeland tunnel, which is the avenue for every pound of ore taken from the mine. The crushing machinery consists of two Blake crushers, 7x10 inches in size, and three pairs of Cornish rolls, each 14-inch face and 22 inches in diameter. The sizing appliances are eight revolving screens, in pairs, the first two sizing the mineral in a dry state, the last six being supplied with water, and another ingenious device for sizing the finer mineral. The separation of the ore from the worthless rock, or concentration of the coarser mineral, is effected by 12 Hartz jigs, and the finest material, the slime, is divided into pure ore, seconds and tailings, by a rotary circular buddle. From the dry screens the coarser particles are returned to the central pair of rolls to be re-crushed, and the finer material is passed down to the wet screens, where it is sized for the jigs. The jigs, like the screens, consist of two sets, counterparts of each other. Each set turns out four sizes of dressed ore, and each jig four grades, the whole forming, when placed in phials and labelled, an interesting representation of the efficiency of the Hartz jig. This is a highly scientific process, and its success depends in a great degree on the amount of "bed" carried in each jig compartment and the quantity of water used.

The refuse, designated "tailings," is usually considered worthless. In the case of the Freeland, however, where every thing is worked on a large and economical scale, it is proposed to work the tailings over again and save as much of the \$3.17 per ton that they contain as human ingenuity can do. For this purpose the company has recently purchased a piece of property at the foot of Trail run, where a 15-stamp mill will be erected, and the tailings subjected to that mode of treatment. Four circular buddles and six jigs will also be used at that point. This is about two and one-half miles from the mine, and the crushed ore tailings and slimes will be run down a flume to the point mentioned, where there is an abundance of water.

The cost of concentrating the Freeland ore is 70 cents per ton, the mineral being reduced 60% during the process. The cost of hauling to the railroad is one dollar per ton. Nine men on each shift are all that are required to run this mill. Four cords of wood, at an expense of two and one-half dollars per cord, are consumed daily. This supplies steam for the motive power and for drying the concentrations. The engine is 100-horse power, and the boilers have double that capacity. The boilers are fed by a No. 3 Knowles pump, and a No. 5 pump of the same kind is used for returning the water from the settlers to the concentrators. Once in 24 hours all the machinery of the dressing works is carefully inspected, and a full supply of water and hose, and a Cameron pump are kept in readiness in case of fire.

The cheap concentration of our ores is a matter of vital interest to this district, and at no other place is the business conducted so extensively, thoroughly and cheaply as at the Freeland.

A LUCKY PROSPECTOR.—The Gold Hill News relates this incident: This spring a man came from Canada to the Comstock. He did not know quartz from granite, failed to get work here and at last joined a small company of prospectors on their way to Red canyon. He could get no "partner," for he knew nothing about prospecting; hence he took to the hills, disconsolate and alone. In wandering one day he came across some dirty-looking stuff, and in crossing a strip of 15 or 20 ft. in width, picked up and pocketed four or five pieces of this rock, thought no more about it, quit and came back. His relatives in Virginia, some 10 days ago, in going through his prospecting duds, found this rock. An assay of the whole averaged \$302.85 in gold and about \$2 in silver. This man returned to the lode and found and located the ledge, and is happy. His friends are happy, too, for they have the extension. It is thought to be the mother lode of that section, for which so much search has been made.

AN OLD LOCATION.—Lone mountain, Nye county, Nev., says the *Bentonian*, where recently some valuable mineral discoveries have been made, proves to have been an old location. A party, while prospecting out there this spring, discovered, half a mile north of the Wide West, an ancient hole in the ground. Although this remarkable shaft was only three ft. in depth, still it was a *bona fide* location. In the hole were found a pick and shovel—that is, what the elements had left of them—and a notice of location was discovered near by securely protected between two flat rocks. This notice is dated October, 1860, nearly 20 years ago, and the location had been made by Mexicans.

A MINIATURE RAILWAY.—The shortest and most profitable railway in the world, is probably to be seen at Coney Island, the famous suburban summer resort for New York persons. This is the "Marine railway" which connects the Manhattan Beach Hotel and the Brighton Beach Hotel. It is 2,000 ft. in length, is laid with steel rail, and has a handsome little station at each end. Its gauge is three ft. Its equipment consists of two locomotives and four cars, open at the sides and having reversible seats. A train of two cars is run every five minutes, and at quite a rapid rate of speed, a flying switch being made at each end. The cost of this miniature road, including stations and equipment was \$27,000, and it paid for itself in a very few weeks after it was opened for business. The operating expenses are \$30 a day and the average receipts are \$450 a day this entire season, \$900 being sometimes taken in. The fare charged is five cents. The road runs quite near the water at high tide, yet leaves an abundance of space for those who prefer to walk. It is owned by the same parties who own the New York and Manhattan Beach road, chief among whom is Mr. Anstin Carbin. The property paid a profit last year of 500% on its cost.—*Railway Age*.

DIVING IN A MINE.—In March last an accident occurred at the large pumping engine at Ladymoor, worked by the South Staffordshire Mines Drainage Commissioners, says the *Colliery Guardian*, by which the lower portion of the bottom lift became disconnected and fell to the bottom of the shaft. As it was found impossible to raise the fallen portion, weighing 8 tons, by ordinary means, it was decided to employ a diver, and one from Essex was sent for. He succeeded in finding the lower portion of the lift at a depth of 100 ft. under water. This he safely attached to the capstan rope, by which it was raised. The engine was then very quickly re-instated, both time and expense having thus been saved. As this experiment succeeded so well the same man has again been called in during the week by the Commissioners, to give an estimate for removing the pumps now under water at Stow Heath. The object sought is the removal of the pumps and the engine to some more suitable place. The diver has descended the shaft, and, after hearing his report, the engineers are now considering the advisability of carrying out the scheme mentioned.

RED SNOW.—On the 25th of April there fell in the French departments, Basses-Alpes and Isere, an abundant snow strongly tinged with red dust. The red matter was so abundant that from Barcelonnette all the mountains looked ochrey up to 2,800 to 3,000 meters. Above this the snow remained quite white. A Notary of the place had a quantity of the snow collected, and, after fusion and filtration, sent some of the dust to M. Daubres, who found in it a large proportion of carbonate of lime; also mica and two feldspars, one of them being orthoclase. The powder, then, had probably a terrestrial and not a cosmic origin; but it appears not to be volcanic, like the ash which has sometimes fallen in Scandinavia after Icelandic eruptions; it also differs from the sand of the Sahara, often carried great distances by winds. The point whence it came is still uncertain, but it is interesting to note that the same kind of substance had fallen in 1846, precisely in the same departments, and in 1863 in the Eastern Pyrenees. Showers of similar dust seem to have fallen in Saone-et-Loire on the 15th of April, and in certain parts of Algeria on the 24th.

STEEL RAILS IN GERMANY.—The mean duration of Bessemer steel rails is, according to experiments made in Germany, about 16 years. On the other hand, 10 years of trial between Cologne and Minden have shown that the renewals were, during that period, 70.7% for fine-grain iron rails, 66.3% for "cementation" steel, 33.3% for puddled steel and 3.4% for Bessemer steel, indicating that the latter would last about 16 years. There are, however, some faults found with this description of rails. The engineers of the Kaiser Ferdinand Northern railway contend that Bessemer steel is less capable of resisting concussion, and that when sudden friction has caused heating of the rails with rapid cooling from snow, injurious molecular changes occur.

NICARAGUAN CANAL SCHEME.—A Washington special says: The projectors of the American Nicaraguan canal scheme are here and are much encouraged over the success of Capt. Phelps, who was sent to Europe to confer with the foreign friends of the enterprise, to see what prospect there was of obtaining European capital. The information from Capt. Phelps is that his mission has been successful, and that he will return about Aug. 1st with the financial interests of the scheme ensured.

DRILLING GLASS.—Stick a piece of stiff clay or putty on the part where you wish to make the hole. Make a hole in the putty the size you want the hole in the glass, reaching to the glass, of course. Into this hole pour a little molten lead, when, unless it is very thick glass, the piece will immediately drop out.—*Design and Work*.

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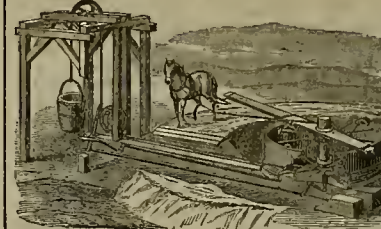
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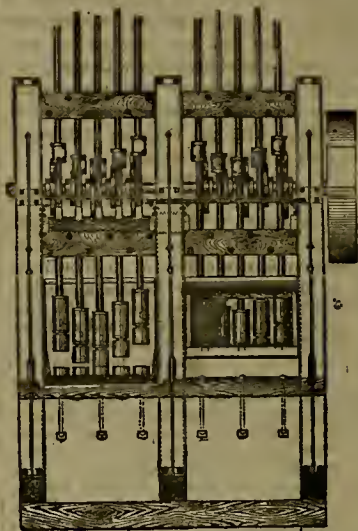
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Notes from Plumas County.—No. 2.

Greenville District.

Mining around Greenville has been active the present season. During the past two years a large amount of capital has been invested in the mines of this locality, now giving a most encouraging showing in finely developed properties. The Crescent mine, situated at Crescent mills, six miles from Greenville, after paying \$800,000 in dividends, and yielding a gross amount of not less than \$1,500,000, in sinking to the depth of 180 ft., for reasons not ascertained, has not been worked for some time. From a brief interview with the Superintendent, it is understood that the company expect to commence operations about the 10th instant (July), with the intention of lowering a new shaft to the depth of 200 ft.

The Green Mountain.

One of the most prominent mines of this section, is also located at Crescent Mills, and most admirably situated for economical working. The property is now controlled in New York. Prior to its purchase by Eastern capitalists, over \$750,000 had been taken out. The main adit tunnel is in over 1,800 ft., and still running through a fine ore body, giving an average width of 10 ft. All the ore is mined and milled, paying \$10 per ton. The present pay chute is 18 ft. wide and 600 ft. long, and is an aggregate of backs in levels Nos. 4 and 5 of 710 ft. Tunnel No. 5 is now in good ore and within 200 ft. of the main pay chute above, which was 16 to 40 ft. in width and 500 ft. in length. Tunnel No. 6, now in about 100 ft., will strike the lode 600 ft. below level No. 5. The mouth of this tunnel is about 50 ft. higher than the base of the new 60-stamp mill now in process of construction, and situated a short distance below. The mill will be completed in about 40 days, and will be run by water power. Weight of stamps 800 lbs. The ore from the lower tunnel will be dumped directly into the mill; that from the upper levels will be conveyed by wire tramway.

The gross yield of the mine for the month of June, with a run of 32 stamps, 450 lbs. weight, 22 days, amounted to \$10,000—the working expense for the month, including dead work, being \$2,600, leaving a nice margin for profit.

The Plumas National.

In the vicinity of Greenville, is also the property of New York capitalists. The mine is represented to be finely developed, and in excellent order—the vein a true fissure, giving evidence of great depth. The main pay chute is over 400 ft. in length, one of the longest in the country. The mine is opened by two levels, giving over two years of ore in sight for the present mill capacity. A third and lower tunnel has been started that will give 300 ft. more of hacks when the vein is reached. A fine 30-stamp mill is running on the mine, connected on a level with the lower tunnel by a substantial tramway.

The company are now building chlorination works for the purpose of working the sulphurets, which are said to be inexhaustible, and giving assays from \$40 to \$50 per ton. True concentrators will also be soon provided for the mill. The mine is thoroughly equipped with a fine plant, and gives promise of rich returns to its owners.

The Gold Stripe Mine

Is another of the fine promising properties in this district. It is situated on Wolf creek, about six miles from Greenville. The substantial improvements and other indications here give evidence of the value of the mine, and of the confidence of its owners in its future. It has now a linear extent of nearly one mile; has been worked for more than three years, turning out in that time a very large amount of bullion. The lode is from 10 to 20 ft. in width, the whole of the ore being extracted and milled, and giving a yield from \$6 to \$10 per ton—the Goodwin portion having given the past year a yield of \$40,000. The ore is free milling and easily worked. It is conveyed to their fine 24-stamp mill by a tramway connected with the lower tunnel. Under the very economical management of Mr. Staudart, the present Superintendent, the average cost for mining, handling and milling of the ore does not exceed \$2.50 per ton; and that taken from one portion of the mine near the surface, leaves the mill with a clear profit of all over and above \$1 per ton. Your correspondent remembers of only one instance coming under his notice on this coast where rock working as low as \$2.50 per ton was made to pay a small profit. Here is an instance worthy of being noted where \$2-ore could be made to yield \$1 profit. Of course it is seldom where the facilities for handling and other conditions are found so favorable as in the case just cited.

The Cherokee Mine,

Near the Round Valley reservoir, is now being put in condition for active operations as soon as the necessary works and hoisting machinery (now on the ground) are erected. It has recently come into the hands of New York capitalists; has a good past record—a large amount of money having been taken out before work was stopped by the burning of its hoisting works. The company have a 16-stamp mill and water power, with capacity for 100 stamps. It is understood also that the Indian Valley and Union mines, consolidated, have passed to

new owners, who contemplate operations at an early day. On this property there are two 24-stamp mills, which will add much to the prosperity of the district when they commence running.

The Bullion Mine,

Near Greenville, on the Big Meadow road, is now being reopened, having been put down a number of years ago to water level. It has been worked more or less in a small way, and some gold extracted from time to time. Hoisting works are about to be put up and work commenced in earnest. Free gold is visible enough in the surface rock without the aid of spectacles.

The Savage, two miles south of Greenville, is down 150 ft. Four men are engaged taking out 36 tons daily. It yields in their 12-stamp mill from \$7 to \$8 per ton.

There are also in this vicinity a number of other promising mines, such as the Antelope, the New York and a few prospect claims which hid fair soon to come to the front.

In addition to valuable mines on one hand and the rich farming lands of Indian valley on the other, Greenville boasts of a substantial foundry, with machine shop complete, capable of turning out machinery as large as is demanded in the country—now building the 60-stamp mill alluded to for the Green Mountain company. It is a neat and orderly town, with a few fine residences, a bank, two good hotels, four large mercantile stores, and all the appointments of a thriving place, giving evidence of being one of the most prosperous towns in this upper country.

With many thanks for information and other favors from Mr. E. Prowatt of the bank, Mr. A. R. Bidwell, superintendents of mines, and others, I remain, as ever yours, etc.,

A. C. K.

A California Songstress.

Madame Jennie Boyer and Samuel Fabian announce a joint benefit concert at Dashway Hall, in this city, on Thursday evening, July 29th. We desire to give this announcement something more than a mere passing notice, for Madame Boyer is one of our most promising San Francisco vocalists. She has recently returned from Europe, where she has spent three years under several of the most celebrated European masters—two years at Milan, where she took a thorough course of instruction in concert, opera and oratorio music, and one year in London studying English and Irish ballads.

Madame Boyer has a soprano voice of great sweetness, purity and power, and it is confidently predicted by her many musical friends, in this city and elsewhere, that she will attain to great eminence in her profession. Her late concert at Dashway Hall was one of the musical successes of the season, fully answering the expectations of her friends, who three years ago encouraged her trip to Europe.

Before leaving Milan she created quite a furore in the vocal world of Europe, as a most promising debutante. The *Milan Gazette* spoke of her in the highest terms of praise. She also attracted much attention in the musical circles of London. The London papers spoke highly of her powers as a vocalist, and much disappointment was felt at her refusal to accept of any of several permanent engagements which were offered her in that city—one of which was tendered her under the auspices of the great composer, Sir Julius Benedict. She was extremely anxious, after a three years' absence to return for a short season to her California home and friends. Mrs. Boyer's manner is extremely pleasing and natural; her voice almost faultless, and there is every indication that she has a brilliant musical career before her. At her coming concert, in addition to Mr. Fabian, she will be supported by the best talent in the city.

We would also mention in this connection that Mrs. Boyer has kindly consented to sing at a concert to be given on Monday evening next, July 26th, for the benefit of the Union Square Baptist Church, in this city, of which church and congregation, she, with her husband, Mr. L. W. Boyer, has long been a member. On that occasion she will also be accompanied by Mr. Samuel Fabian, and supported by other musical artists of note. The concert will be given in the auditorium of the Church.

DEATH OF A VETERAN EDITOR.—A few days since the telegraph announced the sudden death of George Ripley, one of the oldest and most distinguished members of the American press. He "died in his chair in his library," hued with his last breath in his labor of love. Mr. Ripley was associated for years with Horace Greeley on the *Tribune*, and he continued his arduous service as literary editor of that journal up to the instant of his death. Apart from his responsible connection with the *Tribune*, Mr. Ripley was best known as the chief editor of the *American Encyclopedia*, a work which bears the impress of his fine original and catholic spirit. Among his many admirable traits, his sweetness of temper was conspicuous. Whitelaw Reid's eloquent mention of the veteran's death is like a shout of victory: "Full of years and of labors he passed away, as he would have wished, after a serene and honored old age, in the city of his adoption, with family and friends about him, doing his favorite work almost to the end, and dying in his chair in his library."

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

GEOGRAPHICAL GAME CARDS.—Walter G. Read of Epperson, Colusa county, Cal. Patented July 13, 1880. No. 229,914. This invention consists in the employment of a number of cards equal to the number of States and Territories in the United States. At or near the center of each card is drawn, in a distinct color, the State or Territory from which the card derives its name. The suits are designated by the line of latitude passing through or near the State or Territories in that suit, and the value or rank of each card in a suit is determined by the population, which is marked upon one corner, while the figure designating the value or rank of the card is marked upon its face in a large light-line figure, the same figure being also marked of a small size in the upper left-hand corner. These cards are intended for the purpose of instruction, at the same time while they are being used in playing games such as are played with ordinary cards.

SASH FASTENER.—Noah Haynes, San Jose, Cal. Patented, July 13, 1880. No. 226,884. The object of this invention is to provide a means by which the window-sashes of cars, steamers and houses may be made tight and dust-proof in their frames or stops, while at the same time they may be readily raised or lowered or held at any point without liability of jamming. It consists in providing pivoted stops in the frame inside of the sash, which stops are held in contact with the sash by means of a strong spring, the spring being controlled by a lever or knob. The sides of the sash and of the stops are provided with corrugated rubber bands, so that by engaging with each other the sash will be held at any desired point.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

Hoe et al. vs. Cottrell et al.

U. S. Circuit Court, District of Connecticut. Decided March 23, 1880; Shipman, J.

1. The first claim of the patent granted March 16, 1880, to Richard M. Hoe, as assignee of August H. Marioni, declared to be for a patentable combination and sustained.

2. The burden of proof is upon the defendants to overcome the *prima facie* case made by the patent and to establish affirmatively that the party upon whose application a patent was granted was not the sole inventor of the improvement covered thereby.

3. Where M. and C. jointly took out foreign patents, and M. sole subsequently made application for an American patent, which was granted, the testimony of C. that he is a joint inventor with M. controverted by that of M., will not serve to invalidate the patent in the absence of proof of admissions by the latter of joint invention in either of the foreign applications.

4. The decision of the Commissioner of Patents upon the fact that an applicant had complied with the requirements of the statute with regard to his application, and that certain acts were properly done, such as that the drawings and model required by statute were presented, or that an attorney by whom amendments were made was the duly constituted attorney of the applicant or his assignee, or that the specification had been sufficiently sworn to by the inventor, is not to be reviewed collaterally. If the patent is invalid by reason of any or all of these defects, its invalidity is to be determined in a proceeding to set aside the patent by *scire facias*, or by bill or information.

5. Although from the standpoint of after time it might seem difficult to see that a particular combination of old elements should be the exercise of invention, still the fact that in the multiplicity of prior machines in the same line of invention a combination of such value had not been hit upon, and that when introduced its utility was universally recognized, renders it evident that in order to make such combination changes were necessary which the skill of the mechanic would not suggest, and that the work was practically more difficult than to the theorist it might now seem.

6. In determining the question whether there was invention in any particular combination, the important point is to ascertain whether novelty and utility existed. It is true that these requisites may result from mere mechanical skill, and a new and useful combination may be formed by the mere mechanical addition of an old element to an old set of members; but when a device has a new mode of operation which accomplishes necessary results, "looks with favor upon it," and is not exacting as to the degree of inventive skill which was required to produce the new result. There must be some, but a little will suffice.

7. A claim introduced upon amendment which includes an element additional to the combination of which the invention is stated in the body of the specification to consist, is not void where such additional element is shown in the drawing and described in the specification, although not there mentioned as one of the elements of the invention of the applicant.

Banker vs. Bostwick et al.

U. S. Circuit Court, Southern District of New York.—Decided June 14, 1880; Wheeler, J.

1. Letters patent, No. 43,371 granted June 23, 1864, to Banker and Carpenter, assignees of George W. Prince, for improvement in the manufacture of tin cans, sustained.

2. The invention covered by the patent upon which suit was brought, and by that set up in defense being dependent upon certain peculiarities of form and position of parts of operation, which a comparison necessary to consider the drawings in connection with the specifications, and to rely upon the drawings alone to some extent to ascertain the exact form and position of some of the parts.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

THE LITTLE PITTSBURG.—According to late reports from Colorado this notorious Leadville mine is coming out well after all that has been said. Explorations are being pushed in various parts of the property and though no nodules of ore so extensive and rich as those formerly worked have yet been struck, much that is worth working has been reached and more is likely to be.

News in Brief.

CHASTINE COX, who murdered Mrs. Hull in 1879, was hanged at New York, July 16th.

At Manchester and other towns in New Hampshire there was a lively earthquake July 20th.

SOME extensive sulphur beds are being opened up at Cove creek, and shipments will soon be made.

THE French government has ordered an agricultural course in every primary school in the country.

MR. BRADLAUGH has been pronounced by a leading English judge to be one of the best lawyers in England.

A WINNEMUCA (Nev.) man says that plowing ground and turning sheep on it destroys the grasshopper eggs.

COMPLETE editions of Bulwer and Scott are sold on the Nassau street, N. Y., second-hand book stalls for \$1.50.

GARDEN concerts and public dancing are patronized in Berlin by high government officials and society leaders.

MOST of the cities in Virginia have fallen short of public expectation in the census, Richmond having 75,000.

BIG Cottonwood lakes, Utah, are now to be seen in their greatest beauty, and tourists are gathering around them.

TEXAS gave this year its largest yield of wool, 1,300,000 hales of cotton, and an unusually large crop of corn.

THE French Chamber of Deputies voted a credit of 9,000,000 francs for the construction of the Sahara railway.

THE Mormons are taking possession of San Luis Valley, southern Colorado, and have built a town called Manassah.

THE *Coast Mail* says that lately a dog went into the surf between Port Orford and Ellensburg and caught a fur seal.

A RUSSIAN priest was fined and banished for stating from the pulpit, that the entire nobility of Russia is tainted with Nihilism.

At a public meeting in London a protest was entered against the erection in Westminster Abbey of a statue of the Prince Imperial.

A ROBIN has built its nest in a railroad switch, near a New Hampshire station, directly under the signal light, where 25 trains pass every day.

At San Antonio, Texas, July 20th, Gen. Trevino and Miss Ord, daughter of Gen. Ord, were married in church in the presence of 2,000 people.

IN point of wealth the Elberon colony, Long Branch, is almost equal to Newport. It is said that six members represent thirty millions of dollars.

THE wheat crop of Napa county is larger than was anticipated, and the grape crop is expected to be the largest ever harvested in the valley.

THE necessity of raising the grade of the water front of Portland Or., is being discussed in consequence of the late overflow by the Willamette river.

OXFORD tutors are described as less revered by their pupils than formerly, but more in harmony with them and better companions than they used to be.

THE New York employment agencies report that there has been no such demand for labor, both skilled and unskilled, for numbers of years as there is now.

BULLS must be kept tied up this summer, otherwise the country will be dangerous for people who carry the Turkey-red calico parasols now so much affected.

THERE are in New York city 85 Episcopal churches and chapels, the number having doubled in 25 years, and 24,000 children in the Episcopal Sunday-schools.

COACHING has been revived at Newport in all its original glory, there being several members of the coaching club there. A grand parade of the drags is promised in August.

A NEW ORLEANS lady procured, a year ago, over 2,000 silk-worm eggs, from which she raised 2,000 cocoons, and from these she has obtained more than 80,000 eggs.

A new style of "society youth" has appeared at the seaside. He allows his hair to grow long, hnsbee it behind his ears, and refuses to talk upon any topic but decorative art.

THE St. Petersburg Society of Naturalists has given 1,000 rubles each to the two exploring expeditions which go this summer to Lapland and the Mourman coast of the White sea.

THE report that the Russian government will shortly prohibit the exportation of corn is semi-officially contradicted. Statements in regard to the failure of the crops are greatly exaggerated.

NOW that pockets are out of fashion in ladies dresses, hags of various kinds are coming in vogue, and one may expect to see before long some lady carrying a hag like that of the Widow Bedott.

A CHICAGO man makes a living by finding lost articles. He goes to public gardens, parks, etc., every morning before daylight, and looks for anything which persons may have dropped during the previous evening.

MILLE GREVY, daughter of the French President, has received from one of the Siamese Ambassadors in Paris, as a gift, a dress of a peculiar make and material always reserved for royal wear in his native country.

AT Phoenix, Arizona, watermelons are coming in in large quantities. In a few days sweet potatoes will be in the market, and peaches, grapes and figs will be plentiful by the 1st of August, all raised within a few miles of Phoenix.

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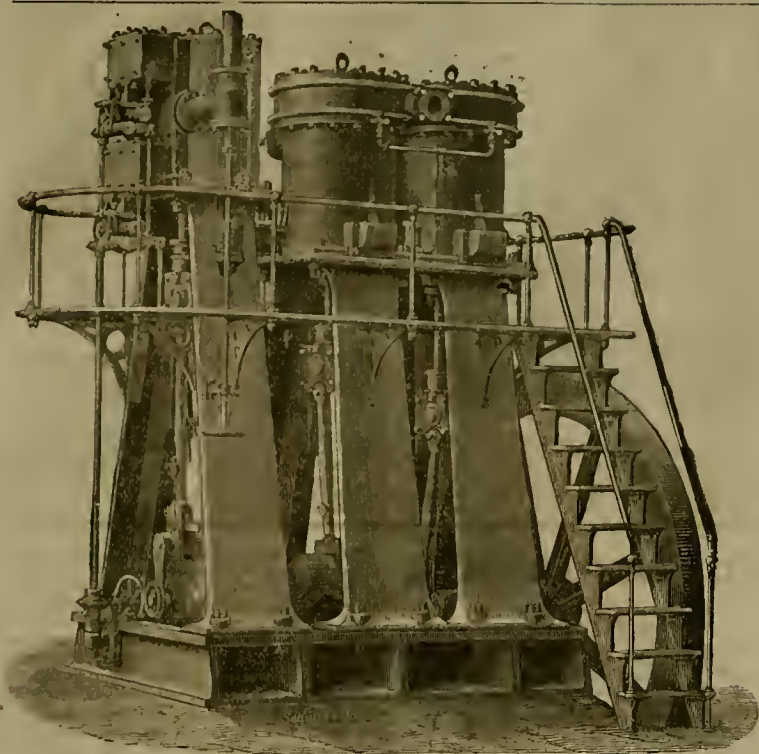
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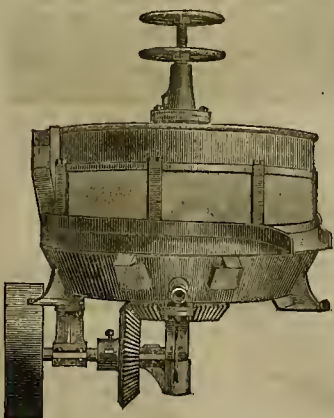
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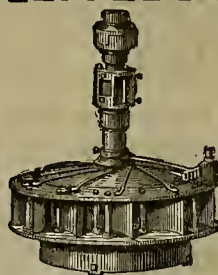
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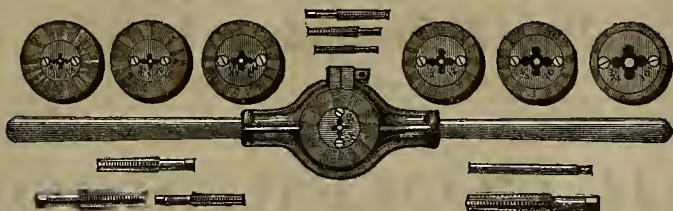
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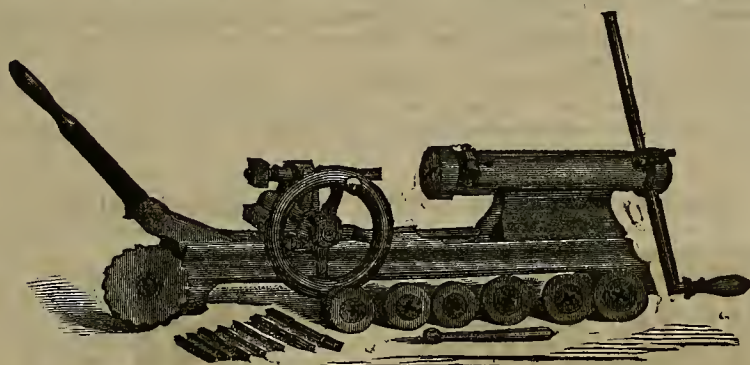
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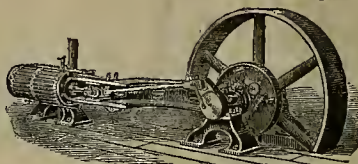
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MINING AND SCIENTIFIC PRESS.

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SAN FRANCISCO, SATURDAY, JULY 31, 1880.

VOLUME XLI
Number 5.

Wanted—An Obelisk.

Obelisks, monoliths, Cleopatra needles, exhumed from the deep oblivion of the centuries, have come into modern fashion. It would appear that the fashion came from Egypt, and the old vagrant monoliths of that country are now in vogue. Paris and London, and now New York, each can point with pride to its obelisk. California needs one. We need one, not to minister to a puerile vanity, but rather to gratify the landable feeling of a proper State pride. We need one to help keep fresh the memory of the most interesting incident in our history. Finally, we need an obelisk to perpetuate the memory of a man whose name will be forever bleuded with the recollection of that incident. Let us raise an obelisk of native granite as a monumental memorial of the discovery of gold in California. That fortuitous incident sharply accented the history of the State, and the enterprise of the pioneer Sutter was the immediate cause of its occurrence. We believe the pioneer societies of the State could not engage in a worthier cause than the erection of a monument for such a purpose. It should be undertaken at once.

There can be no question of the high significance to California of the discovery of gold through the operation of Sutter's enterprise. It goes for nothing that the discovery was purely accidental; that it was simply a happy incident. The discovery of gold at Sutter's mill site did undoubtedly change the early destiny of California, which, but for that incident would not, in all human probability, have differed from that of Kansas or Oregon. Grant that it was an accident; yet it was a fresh thread in that endless web, "woven in the roaring loom of Time," which has more or less changed the pattern of our State. It has redounded to the glory of California, and has done more to achieve her remarkable progress than all the other occurrences in her brief but splendid history. The distinction which California has acquired throughout the world arose, chiefly, from her profuse gold, and to this day California and gold are as intimately associated as Newcastle and coals or France and wine. It may be said that her material wealth and fame are the result of the accidental discovery in April, 1848, of gold at the site of Sutter's saw mill, at a point on the south fork of the American river, long since known as Coloma, in El Dorado county. It would be a slight thing to commemorate such an important event by the erection of a simple monument of stone. Not to do it would be, it seems to us, an omission of grave import to the character and dignity of the State.

It may not now be possible to determine the precise spot where the old sawmill stood. It has long since decayed or has been destroyed, and so far as can be learned every vestige of the work has passed away. But while the exact spot may never be determined, it is now possible to indicate an area, not of great extent, inside of which it can be proved that the mill stood. Indeed, we learn from a writer in the *Georgetown Gazette*, that the site of the mill can be absolutely traced within a radius of 250 ft. All doubt respecting the precise location of the Sutter mill might be removed by embracing a radius of say, 500 ft., or even 1,000 ft.; then let this tract be enclosed as a State park, and in the center erect a granite column, bearing a simple and proper legend, as a memorial monument of the discovery of gold in California. And there let it stand and share the destiny of the great State. Such a monument would fitly commemorate the golden era of California. No learned archaeologist would be required to interpret its legend, for it would tell the marvelous story to every child. It would be an obelisk that we would have pride in and delight to cherish.

THE NATIONAL PARK.—The (*Montana Miner*) says: "Unless an Indian scare or a war breaks out within the next month, the great National Park—the paradise of sight-seers and the finest hunting ground on the continent—will be visited by hundreds of people from Montana alone, to say nothing of those who will come from the country at large.

LIVELY TIMES IN CALAVERAS Co.—According to the *Chronicle*, mining affairs are very lively in Calaveras county. It says that speculators, mining experts, miners and capitalists are arriving almost daily, and engage in negotiations for some of the many gold-bearing mines that occur all over the county. The recent strikes of rich ore in the Boston, Whiskey Slide and Hoosier, as well as in several others of less note, has increased the interest in the mining property to such an extent that it partakes of an exciting boom. The *Chronicle* mentions the sale to San Francisco parties of a mine called

FIG. 1.

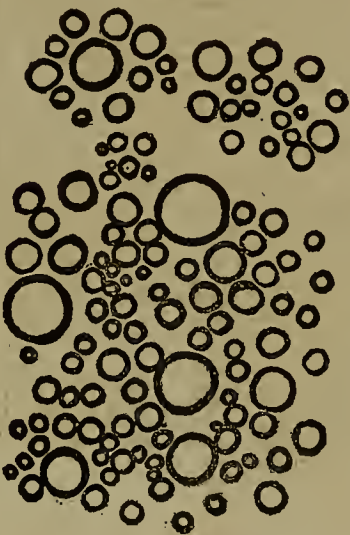


FIG. 3.



PURE AND DISEASED MILK AS SEEN WITH THE MICROSCOPE.

the Baudin, a recent and valuable discovery, and says the new owners intend to work their property immediately, and with vigor. We record these results with pleasure, and hope that the miners of Calaveras and of every other mining county will continue the work of developing their mines, so that men of capital will be induced to examine and buy them. Real, tangible mining property will always command a remunerative price.

CHINESE MINERS.—We learn from a trustworthy source that a company of Chinese is engaged in mining on a very extensive scale on Big Indian bar, on the middle fork of the Feather river. The parties recently purchased a claim of very rich ground there, and are now engaged in building a flume 22 ft. wide and over 400 ft. long. It is said that the ground has hitherto paid well, and is likely still to be productive.

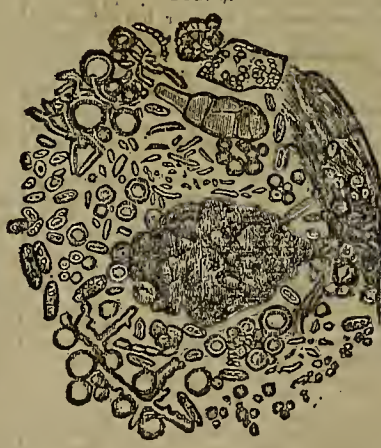
Milk Under the Microscope.

From a pamphlet on milk production recently published by Mr. R. G. Sneath of this city, we reproduce several engravings showing the distinction between healthy and diseased milk as seen by aid of the microscope. The drawings are by Prof. R. U. Piper, of Chicago, who has made prolonged studies of the subject. Fig. 1 is healthy milk. Milk appears under the microscope as if made up of innumerable round globules of varying sizes, floating in a clear or slightly yellowish fluid.

FIG. 2.



FIG. 4.



diseased milk. Fig. 2 is a sample of milk taken from a milk wagon in Chicago. There may be seen some regular globules which are doubtless the true spheres found in pure milk, but there is also a mass of foreign matter which doubtless consists of fungus or animal germs and portions of diseased tissue from the udder of the cow. The appearance in Fig. 2 was gained soon after the milk was drawn. After it was allowed to stand over night it presented the appearance in Fig. 3. Here are seen bacteria, fungi and vibrios, which Prof. Tyndall describes as "long, eel-like organisms, tossing the globules aside, and wriggling more or less rapidly across the field of the microscope." These organisms, that is the bacteria, he tells us, are the agents of all putrefaction.

Fig. 4 is another sample of diseased milk. It was taken from the food of a sick child in Chicago, the milk being supplied by cows fed on distillery swill. The microscope showed it to be filled with uncleanness and diseased matters, and when the food of the child was changed to pure milk it recovered from its illness speedily.

The evil character of the milk which is furnished to city people from swill-fed cows, results, it is believed, in two ways. It may be produced by the introduction of ferments, which enter the blood of the animal from the unhealthy food, and it is also the result of the diseased condition of the udder which accompanies such improper diet. The danger of partaking of poison in their milk always overhangs people who use milk from dairies fed upon distillery or brewery refuse. There is also a diseased condition produced in milk by cows drinking stagnant and foul water, which should always be guarded against both in city and country. It has been proved by the experiments of Prof. Law, of Cornell University, that cows drinking water from impure pools—water containing fungus germs—will have these low vegetable growths conveyed into the circulation, and from the blood transmitted to the milk; that, although the milk did not at first show any signs of the fungi, yet, on standing, it turned out to be bad, and on microscopical investigation, the same fungus vegetation found in the water appeared also in the milk. The cows, too, on examination were found to be affected in health, though to a casual observer they might not appear ailing. The microscopical examination of milk from swill-fed cows has shown not only fungi, but particles of pus, and there can be no doubt that serious troubles have come from partaking of such milk.

The chemical composition of milk made from swill-fed cows is also of interest in this connection. As compared with the composition of pure milk it shows marked variations. We give below an analysis of milk from distillery-fed cows of New York, as follows:

Water.....	93.0
Butter.....	1.3
Caseine.....	3.4
Milk sugar.....	0.7
Salts.....	0.1
	100

Now, milk of average quality has the following composition in 100 parts:

Water.....	87.40
Butter.....	3.43
Caseine.....	3.12
Milk sugar.....	5.12
Mineral matter.....	0.93
	100.00

It will be seen, in comparing the two tables, that the swill-milk contains not only 6% more water, but is sadly deficient in butter and milk sugar.

PERSISTENT EARTHQUAKES.—Since the 18th inst., severe earthquakes have been continuous on the island of Luzon, the chief of the Philippine group. At Manila, the capital city, the destruction of life and property has been very great, and the inhabitants had fled to the fields for refuge. The earth had opened in many places, from which jets of steaming water or showers of ashes were ejected. All the volcanoes on the island were in a state of violent activity. Manila has suffered terribly from earthquakes. One occurred in the middle of the 17th century, by which 3,000 people are said to have perished; in 1832, an earthquake nearly destroyed the city; and another in 1865, caused the loss of several thousand lives.

The other engravings show the appearance of

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EWS

Mining Around Reno, Nev.

EDITORS PRESS:—Mining in this vicinity is confined chiefly to Peavine and Pyramid districts. Each locality shows rich specimens of ore, a varied assortment of the finer and baser metals, some very high assays and several good working tests. The lodes are of good working size, some of them large and well defined, but only a few as yet opened to any considerable depth. Lying as they do in the very shadow of the great Comstock lode, their just merits may have been somewhat eclipsed, and less capital come in on this account. That they are inviting fields for investment, the following facts, gleaned in the neighborhood, and presented as concisely as possible, may be some evidence in corroboration:

The Mines of Peavine District

Extend from the immediate vicinity of Reno for many miles to the northwest—the best developed, and some of the most promising, being within 10 miles of the Central Pacific railroad, and directly on the line of the late survey for the Oregon road, making them very accessible. The surface and surroundings of this whole region give decided indications of its mineral-bearing character. Gold, silver and copper are all found here, sometimes in combination with sulphurets of iron, lead and other base metals.

Two miles north of Reno a ledge (42 ft. in width), of a seemingly valuable mineral point, has been discovered—a fine weather-proof article—pronounced by painters here equal to the best "Prince Metals."

The Paymaster,

A base metal mine (ledge 30 ft. wide), has been opened by a shaft to the depth of 150 ft. The rock has worked by chlorination all the way, from \$80 to \$150 per ton. In connection with this ore there is a large body of lower grade that will pay well by concentrating the sulphurets.

The Poe ledge, on which are several locations, has had working tests as high as \$86 per ton. The Golden Fleece is said to have a good strong vein of eight ft. in width, opened by tunnel and incline, making an aggregate depth from surface of 160 ft. Three miles north of this point there is

A Fine Copper Belt

From which much ore has been shipped, running 40% in copper and about 50 per ton in gold and silver. The Griffin company, made up of citizens of Boston, are now vigorously pushing a tunnel to cut the vein at a depth of 400 ft. from the surface. Eight miles north of these copper mines a gold belt has been discovered, which is now being prospected thoroughly by the Antelope company in particular. They have found six ft. of ore in the lode. The assays for gold run \$30 per ton.

About five miles southwest of Reno is situated

The Mountain View,

A promising claim of carbonate ore, assaying up in the hundreds in silver. Among others here are the Loomie, Reform and Esmeralda Consolidated.

The Unit, owned by Mr. A. H. Barnes of the Golden Eagle hotel, Reno, and other citizens, is a well-defined vein, seven ft. wide between the granite and porphyry, the ore giving free milling assays of \$16 per ton in gold. Arrangements have been made to have 80 tons worked at the Auburn mill near Reno.

The Manselond Mine

Is located three and a half miles from Reno on the western slope of Peavine mountain. A very considerable amount of work has been done here, showing a vein of ore 25 ft. wide, largely impregnated with sulphurets, gold predominating, the whole assays averaging \$25 per ton. The tunnel which is now being driven will be completed within three months, cutting the ledge at the depth of 200 ft. from the surface. It is understood that the company will be incorporated in October, with one-fourth of stock, unassessable, for working capital, and will be duly tested on the Chicago Mining Board.

Pyramid Lake Mining District

Is situated about 30 miles north of Reno and 50 miles from Virginia City. Work commenced, for the first time in earnest, about four years ago. The range for three miles in width is represented to be a porphyry formation, within which are numerous parallel veins. Among a host of locations here, may be named the Buckeye (with a shaft of 150 ft.), the Monarch, the Pyramid Lake (shaft 170 ft.) and the

Jones & Kinkead,

On which about \$50,000 have been expended, steam hoisting works have been erected, and a shaft sunk on the ledge 400 ft. The company had at one time a working test of 227 tons from the 400 level, at the Auburn mill, that yielded \$46. Twenty tons selected and sent to Denver worked as high as \$183 per ton. The full width of the pay vein has not yet been ascertained. They are extracting all the ore for the width of 15 ft. on the 300 level, which is estimated to go from \$20 to \$30 per ton. They have now on the dump about 1,500 tons.

The next mine in order is

The Crown Prince.

The ledge, some 30 ft. in width, was tapped by a tunnel 125 ft. in length. A drift then followed the vein 400 ft., from which 1,000 or 2,000 tons of ore have been extracted, and now lie on the dump. When the ore was first struck three assays were made, the highest giving up to \$1,040 per ton—\$640 in silver and \$400 in gold. The course of the main ledge through the district is north 25° east, with a dip east of about 25°. Taken all in all, this whole region ought to be looked upon as more than promising.

A. C. K.

Notes from Arizona.—No. 1.

EDITORS PRESS:—I propose to write you now and then from this Territory, and generally from some of the mining points; but as yet I have not been at any of the mining localities, and thus, at this writing, will not touch upon any particular mining developments.

The mass of people cannot fully comprehend the great value of a railroad pushing on into and through a country distant from settlements—into a rough, wild region. And but few, perhaps, who take advantage of such great improvement, fully appreciate its benefits. A railroad is the spirit and life really of all sections of the country, but particularly of Arizona. It is the artery or avenue of a vast region, from which everything must spring, as well as tend to. It admits of people getting into and out of a distant land in comparative ease. It brings machinery, goods and everything needed close to hand. A railroad in Arizona merely gives or offers opportunities for fortune, large or small, to the people. With a railroad, mines can be either sold or worked with profit; without it, the richest deposit would have but little value. But little of the actual mining and business movement of Arizona took shape until it was known that a railroad was certainly to pass through the Territory. The mass of people, even those that have never been to this land, either by rail or otherwise, know of the great desert stretch of hundreds of miles on both sides of the Colorado—a vast country without settlement and without prospect of settlement. And thus can one, in passing over such a country, more fully appreciate not only the value of a railroad to parties having interests beyond the desert stretch, but of the enterprise and nerve that conceived and pushed a railroad over such country to completion.

This city has the reputation of having a warm climate, or of being uncomfortably hot, during a portion of the year. While this, to some extent, is true, yet, thus far in July—as objectionable a month as any of the whole year—the thermometer has not touched above 110°, or not above 110° during the season. This information is obtained at the Signal Service office. The old town of Tucson stands 2,500 ft. above the sea level, and nearly every day there is a fine breeze coming up the valley. The Santa Cruz, a small river, winds around close to town, and along its banks there is quite a little forest of trees and green fields stretching away over the valley, furnish a cheerful and cool appearance to the city.

There seemed to be evidence that in all the mountains of southern Arizona, there is a greater or less deposit of precious metals. In many of the mineral localities, however, but little more has yet been done than to establish the fact of the existence of numerous veins of ore. As to their richness, it will require time and labor to determine. But it may, perhaps, be regarded as a settled question, that up to the present time no other region of equal area gives promise of such vast mineral deposits as southern Arizona seems to possess.

Tucson is the chief city and business point of Arizona, and is also important to a range of country of quite large area across the line in old Mexico. Buildings and improvements of modern style may be seen, surrounded by adobe walls, and activity and enterprise mingling through Spanish-Mexican customs and easy life. Viewed from a point of moderate elevation, the spot appears as if aroused by a vitality that both spreads out and raises up. It was a spot of interest in Aztec times, and was more recently known to us as a city among Indians. In the mountains around where a little time ago the Apaches roamed and ruled supreme, the sounds of industry are common, and settlements are gradually spreading out over the plains and valleys, and mining towns are working up over the mountains.

Tucson, July 15, 1880.

PEARLS IN NEW ZEALAND WATERS.—Recently, says the *Anchor Evening Star*, Benjamin Gittoe had been wandering along the banks of the Oakley creek close to the Whau tributary. He was attracted by a peculiar looking shell-fish in one peculiar sand deposit. He had never seen in the whole of the district (during a period of nearly 20 years) any such shell. He made further search and to his astonishment found a large quantity of the fish, varying in size. On opening a few of them he found that the inner coating of the shell was beautifully covered with mother-of-pearl. He extracted several of the fish, and in those of the larger size found several pearls loose in the shell. They have a strange formation and color, not perfectly round, but far more brilliant than those found in the South Seas. He has ten in all which have been pronounced of great value.

California Chrome Iron Ores.

Mr. G. W. Gesner, writing to the *Oil, Paint and Drug Reporter*, gives an interesting description of the location of the chrome ore mines of California, which promise to become the basis of an important industry. Chrome iron ore is found associated with serpentine rock in many parts of the State of California, but owing to lack of transportation facilities, only those of San Luis Obispo county are available. Five miles from San Luis Obispo, on the San Luis Obispo & Santa Maria Valley railroad, is a group of mines extending along a line of two miles, covering an area of 400 acres. From them 15,000 tons have been shipped within the past three years, part of this quantity going to Europe and part to the Eastern States. So far they have merely been prospected, the quantity mined being insignificant in comparison with the quantity to be had. La Trinidad, La Esperanza and El Salto can alone supply any requirement of the trade for years to come. The town of San Luis Obispo, five miles away, with its railroad station, is in the valley 1,800 ft. below the mines, and the roads from the mines clearly traced leading to the main road to the town. Ten miles further away the Pacific can be seen, and in clear weather the Coast Line steamers coming into Port Harford, the shipping port of San Luis Obispo.

Any process for the manufacture of bichromate of potash requires the skill of persons accustomed to chemical operations on a large scale. The usual result in weight that may be looked for from 2,000 lbs. of chrome iron of 50% oxide of chromium is 1,600 lbs. of bichromate of potash. The extent of the manufacture and use of bichromate of potash in this country can be seen from statistics of the trade, which give for the year 1879: Import of bichromate, 2,624,000 lbs.; domestic manufacture, 4,258,000 lbs.; total, 6,882,000 lbs. During the year the price averaged 13 cents per lb., making the total value for that time \$894,660. So far in 1880 the price has averaged 14 cents per lb., with an increased import and a greater domestic production. The chief use of bichromate is in dyeing, in the production of the variety of colors and pigments in which chrome plays such an important part, and in charging batteries for telegraph purposes.

THE QUINN MINE.—We are informed by the *Enterprise*, of the 21st inst., that some remarkably fine specimens of silver ore have recently been taken from the 200 level of the Quinn mine. Among these is a large mass of ore, one side of which is covered with flakes of native silver. This native silver is as bright as a new dollar. In a cavity about the center of the same piece is a small nugget of metallic silver of the same kind. Other pieces of ore are filled with ruby silver and stephanite, and in some are seen, in the same piece of rock, black sulphurets, ruby silver, bright native silver and stephanite. These would make very handsome and valuable specimens for a cabinet. North of the shaft, on the 200 level, a winze is being sunk in the vein. This winze is now down some 15 ft. The material from the bottom of the winze is being hoisted and saved for crushing. The average assay of this is \$102.72. The average was obtained by taking a sample from the top and bottom of each tub of ore. Where they are now at work is at a point where there are no croppings and no sign of ore seen on the surface. The south drift will presently pass under the place where the top of the ore chimney came to the surface—the part where Mr. Quinn for so many years did his surface mining. In that direction something better is looked for than has yet been seen.

HIGH MINES.—The Lake City (Colorado) *Silver World*, says that a tourist over the range from the head of Poughkeepsie to the valley of the west fork of the Animas river, sees when he reaches the summit, near the Mountain Queen mine, a smooth, bare slope of bright yellow rock, the summit of which is 13,200 feet high. This is California mountain, and on its crowning ridge stands the Nevada cabin, a house above the clouds, built of the yellow rock of the mountain. It was built in 1876. The mines which lie on California mountain are named the Virginia, San Francisco, Nevada and Crown Point. The owner intends to work all the mines named. The Virginia carries gray copper, silver sulphuret and glance, which assays 90 ounces silver per ton, and mill runs have yielded from 100 to 110 ounces. The ore has never run less than 40 ounces, and from that up to 500 ounces. Specimen assays from the Nevada lode have run from 75 to 400 ounces. The Crown Point is an extension of the Virginia and the ore is similar to that of the Virginia. The San Francisco is also an extension of the Virginia, and shows the same class of ore.

ACTIVITY IN CALAVERAS.—As an indication of the great activity in mining in Calaveras county, and the interest which has been awakened to that industry, the *Citizen* says it has taken the trouble to ascertain the number of locations of mines which have been recorded in the office of the County Clerk during the past six months, and finds the number to be 325. This certainly looks as if the quartz ledges of Calaveras county were not to have much repose.

THE Egyptian obelisk arrived at New York, July 20th.

A Siam Sapphire Mine.

The term sapphire is usually restricted to clear crystals of bright colors used as gems; while dull, dingy colored crystals and masses are called corundum, and the granular variety of bluish-gray and blackish colors is called emery. Blue is the true sapphire color; when it is of other bright tints it has other names; as Oriental ruby, when red; Oriental topaz, when yellow; and Oriental emerald, when green. Sapphire is pure alumina, and next to the diamond it is, in some of its varieties, the most costly of gems. India, Ceylon and the East, where most of the precious stones are found in abundance, are the parts of the world where the largest number of sapphires have been picked up, from among the pebbles into which the floods have washed them out of the clay. Of recent years, says the *London Echo*, we have heard of the new find of diamonds in Southern Africa, which soon became noised abroad because the locality was near to British colonies. Now we learn through a consular report of a great find of sapphires, the knowledge of which has taken five years to reach this country. A native hunter in Siam came upon a locality, very remote and secluded, which proved to be rich in sapphires. Some men, who immediately followed him, returned to Rangoon and Calcutta with stones which realized large sums. Then came a rush, and thousands of British subjects from Burmah passed through the capital of Siam on their way to the mines. Some of them found fortune, but many others met with jungle fever and died, while those who survived returned home so emaciated that the temptation to grow rich at such a cost lost its force. Consul Newman, of Bangkok, remarks that each miner has been required to pay a license duty of 5s. 7½d., but the authorities have done nothing to prevent so much wealth in precious stones being carried out of their country. The more fortunate miners are very anxious to conceal their gems while they remain in Siam; but one man of whom the consul knows dug out a stone for which he could not find a purchaser on the spot at £100. Accordingly he went to Rangoon, where he was offered £1,500. This awoke him to its value, and, declining the offer, he went to Calcutta, where he eventually obtained £3,000 for his treasure. The largest stone that has been heard of from the Siamese sapphire mines weighed 370 carats in the rough, and, when cut, 111 carats of the finest water. One consequence of these mining operations is a rise in the value of good looking marriageable young women, in whom the lucky miners are investing.

FOSSIL SHARK'S TEETH.—In excavating for a ditch along the face of a bluff bordering on Kern river, says the *Kern County Californian*, Mr. John Barker recently found a magnificent fossil specimen of a shark's tooth some two inches in length. The enamel was so perfectly preserved that the finely serrated edges of the tooth were as sharp as the teeth of a saw. No bones of this animal were found. Fossil remains of this character are quite common in that section. Shark's teeth by the dozen have been picked up on the tops of the adjacent hills 500 ft. or more above the river. This is a fine field for the geologist. The river has cut down hundreds of feet through the sedimentary marine formation which is thus exposed to view in horizontal strata. Imbedded in the face of the bluff on either side of the river for a distance of four miles below the mouth of the canyon, are huge granite boulders, brought down and left by the glacier that chiselled out the gorge in its present form.

A YEAR'S OPERATIONS AT THE MINT.—Operations at the San Francisco mint, during the year ending June 30th, were as follows:

Value of gold operated on.....	\$54,007,049
Value of silver operated on.....	18,308,483
Silver purchased for coinage.....	7,883,895
Ounces of silver (crude and dore) refined.....	5,682,697
Ounces of gold refined.....	489,335
Yielding in standard ounces, gold.....	524,323
Yielding in standard ounces, silver.....	4,887,351
Fine silver bars manufactured for depositors.....	1,969,947

There remain unexpended of the appropriation for mint expenses the following sum:

Wages of workmen.....	\$22,764.25
Contingent expenses.....	41,162.53
Total.....	\$63,926.78

Which amount, after paying all losses and wages chargeable to those appropriations, has been returned to the U. S. Treasury.

HEAVY PRODUCT OF BULLION.—The Colorado correspondent of the *N. Y. Mining Record*, informs that journal that for the six months ending last June 30th, the product of bullion from the Boston & Colorado Smelting Works at Argo, near Denver, was: gold, \$392,283; silver, \$692,787; copper, \$226,000; total, \$1,311,075. The writer assumes that the shipments of gold and silver for the last half of the year will exceed those of the first half, and that the amount of copper will be about equal. He estimates the product of bullion for the year at the large sum of \$3,000,000.

A GRAVEL STRIKE REPORTED.—It is announced by the *Nevada Transcript* of the 20th inst., that a rich strike is reported to have been made in the Albert gravel mine, formerly known as the Buckeye, near Nevada City. It is alleged that gravel was opened which pays as high as 25 cents to the pan. The fortunate owners of the claim are residents of Grase Valley.

MECHANICAL PROGRESS.

Tempering in Sand and Tempering Chisels.

Color tempering in heated sand is a particularly faulty process. It is impracticable to keep the upper surface of sand heated equally with the bottom sand; indeed, it is almost impracticable to heat the upper surface to redness in the open air, the looseness of the sand permitting the heat to pass off so freely. If sand, heated to redness below, is disturbed, that which comes to the surface loses its redness almost instantaneously; as a result, the part of the steel imbedded in the sand heats too much in advance of the exposed surface, hence projecting parts, such as screw-threads, temper too quickly. If the steel is turned over in the sand, the fine particles of the latter obscure the temper colors, and it is doubtful if the best results can be obtained by the use of sand, no matter how slowly it is heated or how slowly the tempering proceeds.

Heated pieces of flat iron are excellent for flat rectangular pieces of steel. The iron should not be too thick in proportion to the size of the article to be tempered, and should be revolved while laying on the iron, as well as being turned over and over. This is necessary in case the iron should be unevenly heated. The article should be tempered slowly resting on the side, faces and edges alternately, so that the heat may approach the center of the steel from all sides (which will induce uniformity). The piece should be removed for a few seconds, occasionally, from the iron, which will give the heat time to penetrate it and retard the heating of exposed edges or projections of small section.

When an article requires tempering in one part only, it is the usual practice to dip it in that part only, leaving the heat remaining in the rest of the steel to draw the temper of the hardened part, and an excellent example of this process is the common chipping chisel or a mill pick. Chipping chisels require to be tempered to the shade of blue that immediately succeeds the purple tints. The taper of a chisel is usually of such degree that by the time the cutting end has had about 5-16 inch removed by the resharpening, that end will be too thick and must be drawn out, as the reforcing is termed, and the object in the hardening will be to have the temper equal in degree throughout this 5-16 inch, and to have the temper back of that run out gradually, and not suddenly, to normal softness, so as to avoid the breakage that will inevitably ensue if any part of the taper end of the chisel is left harder than a blue, or if the part tempered terminates suddenly.

In heating the chisel it should be frequently turned over and over in the fire, and must be occasionally withdrawn from the fire, so as to see that the thin end does not get overheated (which it is, from its thinness, very apt to do) before the thicker part is sufficiently heated. If the thin end is found to be heating too quickly, it may be pushed through the fire into the cooler coals, or dipped slightly at the point; but this latter plan is always to be avoided as much as possible. The blood-red heat should extend for about one-half inch up the chisel, and the end should be dipped about 7-16 inch in the water and held still for about eight seconds. It should then be dipped suddenly another three-eighths inch in the water and quickly withdrawn. The object of this second and deeper immersion is to graduate the temperature of the steel so that the colors shall appear in a broad band and very slowly, so that when the blue appears it will extend over about one-half inch from the chisel end backward. The colors appearing and changing slowly will afford the eye ample time to determine when the exact proper shade of color has arrived, when the chisel may be dipped and withdrawn several times, so as to cool it and leave it tougher than it would be if cooled right off after being tempered to color.—*Joshua Rose in Blacksmith and Wheelwright.*

Use of Glass for Construction.

The use of glass as a material for construction is attracting much attention in England since the practical application of toughened glass to permanent ways has been successfully made. As we have already noted in these columns, Mr. Bucknell, an English engineer, proposes to manufacture pipes for gas and water conduits, for drains and chemical purposes, as well as building blocks and numerous other articles.

In a late paper read before the Society of Arts of London, an interesting account was given of the remarkable results of the strength of examples of toughened glass; and it was asserted that old as the manufacture of glass is, the various processes of toughening it are still in their infancy, and that it is not unreasonable to look for immense improvements in this direction in the future.

Respecting the manufacture of the toughened glass sleepers, which have attracted so much attention by reason of the novelty of the application, it is stated that the clamps and other metallic attachments, are put in red hot while the glass is still fluid, and that when cold the glass and iron hold rigidly together. There is little to be feared of the cracking of such a joint, as the mutual expansibility of glass and iron differs very little. The cost of this tough-

ened glass is, weight for weight, about the same as cast iron; but as the glass is only about one-third as heavy as the iron, it is evident that for equal dimensions the cost of the glass will be only about one-third that of iron, the ton of glass making three times as many sleepers as the ton of iron, supposing it to be so applied.

But the latest application of toughened glass which has been noted is for the manufacture of types for printing purposes. The London *Pottery Gazette* says: "Some experiments are reported to have been made in France with a view to showing whether this substance can be pressed into the printer's service and substituted for the metal composition of which types are made. This latter does not at first sight strike the observer as the best that could be found. It is bright enough when the letters first come from the foundry, and before they have seen any service; but a few days' wear gives the type a very dingy appearance, and before they are finally returned to the melting-pot they have degenerated into a very squalid form, looking dirty in their body as well as battered in their faces. The idea is now to discard these long-proved but unattractive servants, and fill their places with glittering types of glass. The advantages in point of cleanliness alone would, it is alleged, be not insignificant. The toughened glass, which is not to be made in quite the same way as that used for tumblers and wine-glasses, and need not, of course, be quite so transparent, is naturally much harder than the old metal, and can hardly be crushed out of shape by those little accidents which so shorten the life and spoil the beauty of the only type we now employ. It is also capable of being cast into more delicate shapes, so that the difference, for instance, between the thin and the thick strokes can be more clearly defined. Finally, it is now found that the new material can be cast in exactly the same molds as the old, and that therefore there need be no expense incurred in altering the machines and implements used in the manufacture of type."

MALLEABLE nickel and nickel products are among the novelties produced at the establishment of Dr. A. Fleitmann at Iserlohn, Germany. Dr. Fleitmann, it will be remembered by some of our readers, not long ago made some interesting experiments respecting the action of magnesium on the malleability of nickel and cobalt. He found that the addition of very small quantities of the last-named metal overcame the brittleness of nickel and rendered it far more tractable to manipulation. This he ascribed to the action of the magnesium in removing the oxide and other impurities from the metal. He has since reported the observation that an alloy of nickel, with a small percentage of zinc (about 5%), is to some extent malleable, and may be rendered completely so by the addition of so small a quantity as one-twentieth of one per cent. of magnesium. The product resulting from this treatment is capable of being welded to itself and to iron and steel. Messrs. Fleitmann & Witte are said to have rolled sheet-nickel two feet wide, and to have turned out nickel-plated (faced?) sheet iron or steel. The process is to weld thicker plates of nickel to those of iron or steel, heat the same to the required temperature, and then roll them out together in the ordinary way, which, it is said, may be done without scaling.

HINTS CONCERNING SAWS.—A saw just large enough to cut through a board will require less power than a saw larger, the number of teeth, speed, and thickness being equal in each. The more teeth, the more power, provided the thickness, speed and feed are equal. There is, however, a limit, or a point where a few teeth will not answer the place of a large number. The thinner the saw the more teeth will be required to carry an equal amount of feed to each revolution of the saw, but always at the expense of power. When the bench-saw is used, and the sawing is done by a gauge, the lumber is often inclined to clatter and raise up the back of the saw when pushed hard. The reason is that the back half of the saw, having an upward motion, has a tendency to lift and raise the piece being sawn, especially when it springs and pinches on the saw, or crowds between the saw and the gauge; while the cut at the front of the saw has the opposite tendency of holding that part of the piece down. The hook or pitch of the saw-tooth should be on a line from one-quarter to one-fifth the diameter of the saw; a one-quarter pitch is mostly used for hard, and a one-fifth for a softer timber. For very fine-toothed saws designed for heavy work, such as sawing shingles, etc., even from soft wood, one-quarter pitch is best.

ANCIENT AND MODERN MORTARS.—In hardness and binding qualities the ancient mortars surpass the modern; but the supposition that this superiority is to be ascribed to certain secrets of manufacture, or of manipulation, which in our day have been lost (although this assertion is sometimes made), is purely gratuitous. The true explanation, without doubt, is that all mortars improve as they age, and attain their maximum hardness and strength only after a very long time. This is accounted for by the fact that a chemical union takes place between the lime and the silica of the sand composing the mass, and this is an extremely slow process, requiring years to complete. Comparative examinations of ancient and modern mortars, show that the older the mortar the more silicate of lime it contains, and consequently the better its quality.

SCIENTIFIC PROGRESS.

Quantitative Analysis by the Spectroscope.

The progress made in this direction of quantitative analysis by the spectroscope is summed up by the *Manufacturer and Builder* as follows: Experiments to use the spectroscope for quantitative analysis have been undertaken specially with the view of employing it for the assaying of the precious metals, and they have naturally emanated from the scientific departments of the mints. Such experimental attempts have been reported from W. C. Roberts, of the London mint, and A. E. Outerbridge, of the Philadelphia mint, and the results in both were unsatisfactory, so far as establishing a practical working method is concerned. In both cases, the principle which formed the basis of the experiments, was that first noticed by J. Norman Lockyer, a celebrated English spectroscopist, "that when a powerful induction coil is used, and the distance between the metallic electrodes is gradually increased, certain of the lines of the spectrum break in the middle; and that on further increasing the distance between the electrodes, the hiatuses in the spectrum lines increase proportionally, until the lines themselves finally disappear." Mr. Outerbridge, whose experimental investigations of this subject were very exhaustive, found, in his attempts to found a working quantitative method of analysis on Lockyer's discovery, that the method was defective in the extreme. He reports that the differences between the spectra of two alloys of considerable difference in constitution, were very slight; and where the alloys approached closely in composition, the spectral differences were quite unappreciable. A difference of one-1,000th, for example, required an effort of the imagination to detect. The amount of metal vaporized was found to be too infinitesimal to give safe results on a large scale, since these results would be likely to be vitiated by the slightest want of homogeneity of the alloy. This point will be appreciated when it is stated that the quantity of metal vaporized by each spark was found not to exceed the one-1,000,000th of a grain. Finally, Mr. Outerbridge found that while the spectroscope was very sensitive to pure metals, a comparatively large quantity of gold could be present in an alloy, and the spectroscope would not indicate its presence. In an alloy of gold and copper, for example, containing from 200 to 250 of gold, the spectrum of gold is scarcely visible; and this same want of sensitiveness holds good of other metallic alloys. On these grounds, Mr. Outerbridge has pronounced the use of the spectroscope for assaying to be impracticable.

WIND PRESSURE.—Does the wind, in passing through the open spaces left between the solid members of an articulated structure (such as a bridge), experience no further resistance than that offered by the net area of the solid surfaces of the members? We think it does. Air is a fluid equally with water, and it is well known that when water issues through an orifice in a flat surface, the issuing stream is very sensibly contracted to much less than the area of the orifice. This coefficient of discharge through holes in plates or flat surfaces is as low as 0.62%; or, in other words, only 62% of the opening is truly effective for the passage of the liquid. Without doubt, these principles apply equally to all fluids, gaseous as well as liquids. In the case, then, of air flowing through an articulated structure, we do not think that the full area of the opening, between the solid members, should be considered as effective for the passage of the air, but only to a reduced extent of, perhaps, from 60% to 70%. This would have the effect of adding very largely to the gross resistance offered by any articulated structure to the wind—in fact, it would cause an addition of from 30% to 40% of the openings to be added to the solid members as representing the whole area offering a resistance to the passage of the wind. This additional amount of resistance may be found more than sufficient to occasion overturn, when otherwise it would be far from being anticipated by calculation.—*Iron.*

RESPIRATIVE POWER OF MARSH AND WATER PLANTS.—It is a well-known fact that these plants are able to thrive in media which contain little or no oxygen. They are all very poor in nitrogen, and E. Freyberg has shown, by a number of experiments, that this latter property accounts for the former. His investigations prove that the respirative power of plants varies with the amount of nitrogen they consume, and this, taken in conjunction with the fact that water plants contain large air chambers which do not often need refilling, accounts for their being able to exist in media which contain very little oxygen.

WONDERFULLY SENSITIVE PHOTO PLATES.—Photo plates made by the new photo gelatin-bromide process have such a remarkable sensitiveness that soft harmonious negatives may be secured in one-sixtieth of a second. The opportunities for instantaneous pictures are thus greatly extended. At a recent meeting of the Society of Arts, London, Mr. Gale exhibited photographs in which was shown the picture of a swallow poisoning in the air over a pond, the shadow and reflection in the water being very perfect.

Electrical Insects.

It is not generally known that there are insects which possess the peculiar electrical properties of the *Raia torpeda* and *Gymnotus electricus*. Kirby and Spence, in their entomology, describe the *Reduvius serratus*, commonly known in the West Indies as the *wheel bug*, as an insect which can communicate an electric shock to the person whose flesh it touches. The late Major-General Davis, of the Royal Artillery, well known as a most accurate observer of nature, and an indefatigable collector of her treasures, as well as a most admirable painter of them, once informed me, that, when abroad, having taken up this animal and placed it upon his hand, it gave him a considerable shock with its legs, as if from an electric jar, which he felt as high as his shoulder, and dropping the creature, he observed six marks upon his hand where the six feet had stood. Two similar instances of effects upon the human system resembling electric shocks, produced by insects, have been communicated to the Entomological Society by Mr. Yarell; one mentioned in a letter from Lady de Gray, of Groby, in which the shock was caused by a beetle, one of the common *Elateridae*, and extended from the hand to the elbow on suddenly touching the insect; the other caused by a large, hairy lepidopterous caterpillar, picked up in South America by Capt. Blakeney, R. N., who felt on touching it a sensation extending up his arm, similar to an electric shock, of such force that he lost the use of his arm for a time, and his life was even considered in danger by his medical attendant.

PREMIUM OF \$1,000 FOR SCIENTISTS.—The National Board of Trade passed a resolution, at a meeting held on the 12th of December last, offering the sum of \$1,000, as follows, viz.: \$500 for the best essay and draft of bill on the adulterations of food and drink in the United States, \$300 for the second best, and \$200 for the third. The objects to be kept in view in preparing the essay shall be to show: First, what are the deleterious adulterations of articles of food and drink in this country; second, the effect of these adulterations on health and trade; third, the best means of detecting and preventing their recurrence with the least interference with commerce, and with the least expense to the community; fourth, the reasons for the legislation proposed, is the draft of the laws proposed must be in such form that they can be at once submitted to State legislatures and to Congress for adoption. The different essays must be written in legal form on foolscap paper, the writing to be on one side of the sheet only. The time for completion is limited to the first day of October, 1880. The Committee of Award consists of Dr. John S. Billings, U. S., Washington, D. C.; Prof. Chas. E. Chandler, New York; Ex-Chancellor B. Williamson, Elizabeth, N. J.; A. D. Hardy, Esq., Boston; and John N. Gano, Esq., Cincinnati.

THE PRACTICAL VALUE OF SCIENCE.—"I have endeavored to State the higher and more abstract arguments by which the study of physical science may be shown to be indispensable to the complete training of the human mind, but I do not wish to be supposed that because I may be devoted to more or less abstract and unpractical pursuits I am insensible to the weight which ought to be attached to that which has been said to be the English conception of Paradise—namely, 'getting on.' Now the value of a knowledge of physical science as a means of getting on, is indubitable. There are hardly any of our trades, except the merely bucksterning ones, in which some knowledge of science may not be directly profitable to the pursuer of that occupation. An industry attains higher stages of its development as its processes become more complicated and refined, and the sciences are dragged in, one by one, to take their share in the fray."—*Huxley.*

EARTHQUAKE WARNINGS.—In a recent lecture on the possibility of foretelling earthquakes, Prof. Palmieri expressed the belief that by means of seismographic stations, telegraphically connected, for registering and reporting preliminary earth tremblings, it would be possible to foretell earthquakes just as tempests are now foretold, and to issue warnings to threatened districts about three days in advance. He did not expect to live to see such a system in operation, but he hoped and in a measure expected that posterity would be benefited by its universal and permanent establishment.

THE AMERICAN SCIENCE ASSOCIATION.—The 29th meeting of the American Association for the Advancement of Science will begin August 25th, in the Massachusetts Institute of Technology, Boston. An exceptionally large gathering of prominent scientific workers is anticipated. One of the morning sessions will be held at Cambridge, and the rest of the day will be devoted to an inspection of the various departments and museums of Harvard University and the Observatory.

A CURIOUS EXPLOSIVE.—An alloy of rhodium and lead, lately exhibited before the French Academy of Sciences, has the curious property of exploding on exposure to heat, as in being held before a gas flame. Its composition is one-third rhodium and two-thirds lead, fused together in a crucible, at a high temperature.

Mr. Brown, mining operator formerly of Southern Nevada, has made a pretty thorough examination into several Inyo mining properties. He has bought the Orion

gold mine and little mill at Old Coso, acquiring both the conflicting titles of Fuentes & Co. and that of P. Reddy. He is putting on a force of men and will soon commence shipping gold, having gone into the business on that proposition solely.

KERN.

WHITE RIVER NOTE.—*Californian*, July 22: The best prospecting ground in Kern county, and quite as good, we venture to say, as any in Arizona, is at White river, along the base of the Big Blue mountain. Several gold ledges of great value have been found there lately, and as yet hardly any real prospecting work has been done.

MONO.

LARS DISTRICT.—*Mammoth City Herald*, July 17: In tunnel No. 3 in the Mammoth, a distance of 42 ft has been run, giving a total of 1,174 ft. In No. 2, 29 ft; total, 944. The upraise No. 3 tunnel to No. 2 has been connected and an ore-chute put in. The work of relieving the old winze from No. 2 to No. 3 tunnel has been completed. Number of tons of ore sent to mill during the week, 304. Work on the head of No. 4 tunnel has not yet been resumed, the flow of water continuing unabated. The shaft of the new water race has been raised and the building will be completed during the coming week. The mill is running steadily, with everything in excellent working order.

H. L. & M. C. JOINT TUNNEL.—On Tuesday last the air compressor and the engine which drives it were found to be so much out of repair as to be almost useless. The cylinder-rings in the air-chamber were so badly worn that the air escape and it was difficult to keep pressure enough to run the drilling machine. The rings have been expanded and faced up in the Mammoth Co.'s shops, and the engine put in perfect running order. The work was resumed last evening, and Mr. Crittenden informs us that the whole machine is now as good as a new one.

WHITE MOUNTAINS.—*Bodie Free Press*, July 22: J. Wagner has just returned from the White mountains, 40 miles from Lake District, where he made some good locations. One ledge was uncovered that shows free gold in considerable quantities. The croppings are prominent and the main ledge, he thinks, is at least 40 ft wide. It crowns a high hill; on one side gold is found and on the other silver. Several men are prospecting in that vicinity and are confident of finding something good. The White mountains have never been thoroughly prospected, and it is believed rich veins will some day be opened up. The field is large and inviting.

NEVADA.

NEW MINING CO.—*Transcript*, July 20: A consolidation of the El Capitán, Wheel Jano and Transcript mines in Gold Flat, in this district, has been effected, and reincorporated under the title of the New York and Boston gold mining company, with a capital of \$1,000,000, at \$5 a share. Earle W. Johnson, of Boston, is President, and B. G. Bloss, of New York city, Vice-President. The property of the company covers a longitudinal area of 3,630 ft by 600 wide.

NOTES FROM THE RIDGE.—*Grass Valley Union*, July 21: Hydraulic mining is now being actively prosecuted at all points along the Ridge, the water supply being good, and some of the companies will be enabled to work entirely through the season. At Moore's Flat and vicinity there is much activity in mining, and plenty of water so far to meet all demands. The North Bloomfield mining company is running full handed, and has not yet commenced to draw upon their reservoir of water in their large dam on Canyon creek. Some snow is yet to be seen between Esmeralda and Canyon creek, that will furnish water for that reservoir.

WATER SUPPLY.—There is every promise that the water supply for the up-country mines will be better than ever before known, from the fact of the quantity of snow that fell last winter, and the better facilities now possessed for catching the seepage by means of the large reservoirs in the high mountain valleys.

CHINER NOTES.—*Cor. Herald*, July 22: The English company has commenced sinking a shaft in their mine on Badger hill. They have already reached a depth of 25 ft. This company is composed of energetic men who firmly believe that man cannot replenish his pocket-book at will without putting his shoulder to the wheel with a determination. Nearly 20 men are employed in this mine.

BENNETTS.—The men are engaged in prospecting the Benneville mine, situated at Little Grass Valley, near Columbia Hill, and are pushing things ahead in good earnest.

EUREKA LAKE CO.—This company is having hoisting works erected at its shaft, which is being driven down in the mine known as the Consolidated, situated near the old town site of Columbia Hill. The necessary machinery has been ordered, and it is to arrive soon. A number of experienced miners, with whom I have conversed in relation to this project, say that it is evident that good results will come from it, and the entire Ridge benefited thereby.

A RICH STRIKE.—*Transcript*, July 25: Several years ago some parties ran a tunnel on Gold flat to drain a ledge they owned. After advancing some 200 ft they quit there. Recently Messrs. Stephens & Vance relocated the claim, and after cleaning out the old tunnel, resumed operations in it. A ledge varying from 8 to 20 inches in thickness was found, and from it were taken 10 tons of ore. This has just been crushed at Keith's mill on the Plaza, and paid \$27 a ton in free gold and about \$3 in sulphurets. The reporter has seen some of the ore, and it shows well in free gold and sulphurets. The size of the ledge and the quality of it increases rapidly with depth.

PLACER.

KINDER MINE.—*Dutch Flat Forum*, July 24: Charles Carr informs us that they are now washing pay dirt that a year ago would average \$2.50 a day with the old styled sluice box and pick and shovel in the Kinder mine. This section has been a good paying one in these diggings. The water is rather low now and work will be suspended in about 1 week. Mr. Carr says he will clean up his sluices and undercurrents in about 2 weeks, and anticipates a good season's run.

A GOOD CLEAN-UP.—*Cor. Herald*, July 24: The Van Esmeralda Bros. have just finished their first clean-up and the way that they piled up the dirt is gladdening. You don't like to see 400 ounces of gold dust in one little pile? If you would, come up and take a peep into their safe—no amalgam or dirt, but clean, bright, pure gold, worth \$19.50 per ounce.

NOTES.—Bill Mitchell has struck the richest kind of gravel, and has a magnificent prospect for a good time. This claim adjoins the famous Rainbow mine. Mr. T. O. Durning, of Iowa Hill, reports the water season at the hill as about ended, and the mines in consequence mostly shut down for the season.

PLUMAS.

BELL MINE.—*National*, July 24: The workmen in this mine have been following the rich ledge for some 30 ft, and most of the time the rock shows free gold. The ledge is 4 or 5 ft thick, and the rich rock is on the footwall. It is beautiful bluish-white quartz, and of a much better quality than in any other part of the mine. On Wednesday the work developed a lot of rich rock, and we were shown about half a pan full of quartz which probably contained \$300 in gold. Many places, where the rock had decomposed, were nearly pure gold, and the whole mass was brilliantly studded with the bright dust. The mill is paying well, and the pay increasing regularly. A bar worth \$1,900 was sent to the Chicago office the other day.

GRAN MOUNTAIN MINE.—This mine is located 16 miles from Quincy, and is owned by a company of New York capitalists. They have 150 men at work and are erecting a 60-stamp mill. Two mills, one 10-stamp and the other 20, are constantly working the rock extracted. The vein varies in width from 12 to 18 ft. It is low grade, averaging \$10 per ton.

SIERRA.

GOOD HOPE EXTENSION.—*Mountain Messenger*, July 24: We visited this property lately and saw that although not much work had been done, enough had been accomplished to show that a very large ledge passes through the claim. Samples of ore taken from a number of places on the croppings will yield probably from \$8 to \$20 per ton. Timber

is plentiful along the large vein, and ample water power can be had at the North Fork, perhaps a mile distant.

PROSPECTIVE WORK.—A Mr. Rouse, from Contra Costa county, has been some time prospecting the old Ohlin and Pomeroy claims above Wahoo. He has a tunnel some 600 ft long and has found gravel that will pay 25 cents to the pan.

NOTES.—There is a great deal of prospecting being done in the neighborhood of Milton since the snow disappeared, and considerable excitement prevails. Work has been started on the Mastodon Con. mining company's property, and the indications met with thus far are quite favorable. All the section of country located on the ridge between Forest City and Gold Lake, a distance of some 30 miles, is now actively prospected. There are probably several hundred claims located within this distance, and work is in active progress upon a large number of them. It is believed by those competent to judge that a gravel channel follows the ridge for the whole distance, and will pay wherever opened.

SISKIYOU.

GRAVEL STRIKE.—*Cor. Redding Independent*, July 17: The last chance, near Calihans, has struck a body of gravel which is paying \$13 per day to the man. They work through a shaft 45 ft deep, using water power for hoisting the material.

QUARTZ STRIKE.—Rich quartz is reported at Six-Mile creek, near the Black Bear mine. Some prospectors struck a vein, and from 25 lbs of rock took \$152.

TRINITY.

BUCKEYE W. & H. M. CO.—*Journal*, July 24: We learn that work has commenced on the last half mile of the Stuart Fork ditch, and that the enterprise will be completed in a few weeks. With water through this entire line of the ditch and completion of their bedrock tunnel, the Buckeye company will be in condition to make a splendid showing with their Bolts Hill property.

TUOLUMNE.

GLARK MINE.—*Cor. Independent*, July 24: This mine is still looking as well as ever. Work on the mill is being pushed forward as rapidly as circumstances will permit. An immense hopper has been built near the shaft, into which the ore is dumped from the car, from whence it will be let into the wagons beneath and taken away.

The 18-crozier of mill in the vicinity of Jamestown are being rapidly developed, and mills and other expensives improvements are going up in every direction—a state of affairs that has already created a demand for good houses in this town.

SONORA ITEM.—We are informed that Adam Haag has placed his sulphurets mine, on Sonora creek, into the hands of a San Francisco company, who will at once proceed to develop the mine, and, with the most approved and latest appliances, for the successful working of sulphurets ore.

NEVADA.

WASHOE DISTRICT.

SAVAGE.—*Gold Hill News*, July 23: The bulkhead on the 2300 level is about completed and ready to close. This will shut the water flowing from the incline from that level, but will not prevent it from following up the incline. There is no opening for it on the 2100 level. It may raise to the 2000 level, and if so, it will either be conducted in pipes to the C. N. S. shaft or will be raised to the 2100 level by the Savage pumps, running at a greatly-reduced rate.

SILVERA NEVADA.—The crosscut east, 1,010 ft north of the incline and on the 2400 level, has been stopped till the water is out of the incline. This will be accomplished by Friday night. The crosscut was commenced to be in readiness when the opportunity should be presented for pushing it ahead.

THE TEXAS.—The north drift on the 2500 level is passing through dry vein porphyry, which needs no timbering and through which the exceedingly rapid progress of 10 ft per day is made.

UNION CON.—Work from winze No. 1 toward winze No. 2 on the 2500 level has been suspended and the men taken out and set to work connecting the drift north and west from winze No. 1 with the station of the Sierra Nevada incline.

CALIFORNIA.—The north drift on the 2300 level is advancing to make connection with the drift south from the Gphir line, and complete the thoroughfare on this level from the C. & C. shaft to the Union shaft. The joint Gphir crosscut east on the 2000 level, from which a winze is to be sunk to the 2300 level, is averaging 3 ft per day.

ATRA.—In about 2 days more the station on the 2050 level of the incline will be completed. The body of quartz struck on this station was from 5 to 6 ft in width and gave low assays.

CHOLLAR.—The flow of water to the C. N. S. shaft from the Hale & Norcross winze and the drift west on the 2400 level continues to decrease.

GPHIR.—The joint Mexican crosscut on the 2500 level is averaging 3 ft per day through the station on the 2050 level of the incline will be completed. The body of quartz struck on this station was from 5 to 6 ft in width and gave low assays.

BECHER.—The diamond drill has been running east from the end of the south drift on 2760 level, and has penetrated porphyry carrying promising quartz, and encountered a very strong flow of hot water which is supposed to come from the same body found east on the 3000 level.

CON. VIRGINIA.—The stopes on the 1750 level are yielding as usual. The joint Best & Belcher winze is going on down below the 2000 level and the south drift on the 2300 level is advancing 20 ft.

BECHER.—The diamond drill has been running east from the end of the south drift on 2760 level, and has penetrated porphyry carrying promising quartz, and encountered a very strong flow of hot water which is supposed to come from the same body found east on the 3000 level.

YELLOW JACKET.—Pump-and-repaired and pumps working well. Yellow jacket ground has been reached in the east drift, 2325 level. The diamond drill is running east in crosscut on the 2700 level, to guard against water.

CROWN POINT.—The drift connecting with the 2525 level of Jacket has been graded down 420 ft, and the drain has been cut 200 ft.

CON. IMPERIAL.—The crosscut west from the foot of the south winze, and on the 2510 level, has attained a total length of 50 ft, and continues in a mixture of quartz and porphyry.

UNION SHAFT.—Cutting out the 4th compartment of the shaft from 5 different points and the tank-pit at the 2500 level. The pump at the 2500 level is running regularly.

OVERMAN.—The incline raise above the 700 level is going on up, and is cutting porphyry carrying seams of quartz.

BECHER.—The diamond drill sent in from the face of the drift on the 2000 level has encountered water and been withdrawn.

QUINN.—Still raising some ore which assays well. Work is going on in the winze below the 200 level.

UTAH.—The incline is 35 ft below the 1950 level. The east drift on the 1950 level is still in hard rock. The ore vein has not yet been reached.

SUTRO TUNNEL.—Both headers are progressing well; total length of north lateral, 3,690 ft; south lateral, 1,440 ft.

AURORA DISTRICT.

THE PROSPECTUS.—*Esmeralda Herald*, July 24: Prospect tunnel No. 1, of the Prospectus, having been thoroughly opened up to a distance of 100 ft, all the way in good ore, work was shut off last Saturday. South drift about 20 ft in rich ore has been reached, and the shaft did not. Work was stopped in the tunnel and in both drifts, for the reason that the ore was all good milling and no dump was ready to receive it. Biased tunnel, located about 500 ft south of Prospect tunnel No. 1, was started up the first of the week. A contract for 200 ft was let, to be pushed night and day until completed.

NORTHERN BELLE.—A drift has been run in 70 ft from the Northern Belle shaft to the south, to open up the American mine. This drift will tap the ledge of the latter mine at a depth of 140 ft. The drift is all the way in the ledge, and the ore is considered good the whole distance. Another drift is being run south from the bottom of the shaft to tap the Northern Belle ledge.

THANKS TO VINO.—The north drift is now in 46 ft, the face

of the drift showing the best looking ore yet found in the mine; the south drift 60 ft, the crosscut 56 ft, which exposes an immense amount of ore. There is 250 tons of ore now piled up on the dump.

GRAND TRUNK.—The crosscut of the Grand Trunk has been advanced 24 ft since our last report, leaving about 10 ft to be accomplished to tap the ledge.

REAL DEL MONTE.—Since last report the plunger pump on the 500 level has been connected and started up, and is now working smoothly.

NOTES.—Win McKinlay and C. E. Winters have leased the McIntosh & Barnes mine, owned by W. P. McIntosh, and commenced taking out ore yesterday. They inform us that the ore is rich enough to make a nice little dividend. By the middle of next month they will send a crushing to the Millers' mill.

BRISTOL DISTRICT.

HILLSBORO.—*Flores Record*, July 17: This Hillsdale furnace is running well and turning out 100 bars a day. Coal and lead ore are coming in fast, and there is every prospect for a long and successful run. The mine is still improving on the 40 ft level, and the ground is improving.

NOTES.—Work was suspended on the Lons Vale shaft, owing to the foul air, but was resumed on the Monarchist, to cut this ledge higher up.

CHERRY OREEK DISTRICT.

MINING NOTES.—*White Pine News*, July 13: The Sadie L. mine, at Silver canyon, has an incline down something over 100 ft, showing a strong ledge of high-grade ore.

COMET M. CO.—Mr. John Reese has been appointed Superintendent of this company's property, and has a force of men at work on the mine. The Comet company is a San Francisco incorporation, and the mine lies adjacent to and north of the Star mine, and will undoubtedly prove a valuable property.

COLUMBUS DISTRICT.

NORTHERN BELL.—*True Fessure*, July 24: The drift from the bottom of the winze on the 10th level has been advanced 12 ft during the week. In the 3d level the atope above the main tunnel shows an improvement. Three ft of 85-ore is in the atope, and value of the ore in the atope. Some very rich ore is being extracted from the stopes above the east drift on the 3d level. The 10th and 2d levels show no material change. The shipment of ore approximately 95 tons. Both mills are running to full capacity.

LUCKY HILL.—This winze has reached a depth of 100 ft. The bottom is in manganese ore, and the ground is of a good character in which to make progress. The south crosscut in 40 ft, and the ground is improving. The hoisting works for the mine are arriving, and their erection will be immediate. As soon as they are ready, the work of opening the mine will be pushed ahead vigorously.

TINER.—Work has been resumed on this mine, and sinking on the ledge is progressing fairly. The croppings of this mine assay well, going from \$80 to \$180.

ENTERPRISE & NEXUS.—This tunnel has been advanced 45 ft since the contractors have begun operations. The character of the ground is improving.

WINDSOR.—The shaft is now down 95 ft, and is in a very fair character of ore. Work is being pushed as fast as possible.

GENERAL JACKSON.—The incline, which is now down 165 ft, is in small stringers of ore. Favorable progress has been made.

SINKING.—Sinking the winze still continues. It is in good ore all the way. The still is from 6 to 7 ft. The main tunnel is still progressing with good headway. It is daily expected that ore will be found.

EUREKA DISTRICT.

RICHMOND CON.—*London Mining Journal*, July 3: The usual telegram from the mines at Eureka states that the week's run was \$70,000, from 1,125 tons of ore. During the week the refinery produced ore bars to the value of \$55,000. The manager reports that a rise has been started in back of the 200 level north, near the cave he spoke of in his last; it was up 11 ft on a seam of good ore. The 400 level north of the 200 level has been advanced 27 ft in favorable ground. In the winze below the 700 level they have begun to stoop the ore; the vein is from 3 to 5 ft wide of good quality ore.

RUBY DUNDERBERG.—The force at the mine has been increased, and the output has thus been increased to 219 tons of high-grade ore. The ore smelted during the week realized about \$7,000, and as the monthly expenses average \$5,000, there is a reasonable profit. The mine has been received which it is believed will be continued monthly. The mines in the vicinity of the Ruby and Richmond are attracting considerable attention, and profitable developments are being made in several of them.

NOTES.—*Sentinel*, July 21: Mr. Joseph Mendes yesterday paid a visit to his California mine. He informs us that the property is looking exceedingly well. A new ore body has been discovered in the main shaft, which gives promise of being a great bonanza. The ore is richer than any hitherto found in the mine.

PARADISE DISTRICT.

BULLION.—*Reporter*, July 21: On Tuesday last a strike of ruby ore was made in the Bullion, at the foot of the winze. The extent of the ore body can as yet only be surmised, but the strike is a very important one, as it proves the existence of very rich ore below the 200 level, the lowest yet attained in the mine.

PARADISE.—From authentic reports we learn that the Paradise never looked better in its history. There is an abundance of ore in sight in the mine, and considerable at the mill. The working force on the claim has been increased to 40 men, and the work of extracting ore and developing the mine is being actively and very ably prosecuted.

NOTES.—It is currently reported that a company of Chicago capitalists are making overtures for the purchase of the Mount Rose. The Mary Wilder is sorting ore for shipment to the Bullion mill. J. Fitzgerald has secured a very favorable lease on the Glory, and work will be resumed without delay.

PHILADELPHIA DISTRICT.

BELMONT.—Superintendent's Letter, July 15: All work at the mine was continued without interruption during the past week, with results of the most favorable kind. We commenced on the 6th inst. the extraction of ore from the north part of the mine, and from present indications, the same can be kept up for, say, 6 months, as we have the openings about all completed, and will have but little dead work to do in this part of the mine for some time. We have discontinued driving the drifts north and south from the long raise in the north part of the mine and commenced stooping out the ore, which is looking fine.

BARCELONA.—Superintendent's Letter, July 15: Since last report of July 3th, we have advanced 6 ft in the north level, which is yielding the finest ore ever taken from the mine at any time. We are working 1 shift in the level, and average 2 tons of ore per day. One ton, first class, assays over \$500; second class, \$125 per ton. It shows a splendid face of ore over 4 ft. Upraise in fine body of ore; work is progressing finely. Have advanced 18 ft in air shaft on the surface, having water to contend with.

PIOCHE DISTRICT.

EL DORADO CANYON.—*Record*, July 17: The work on the mines at El Dorado canyon is still steadily kept up. Owing to the fact that the company is keeping their miners busy prospecting, and now have their mine in such shape that when the mill is ready to start up all they have to do is to extract ore, all the dead work having been done. The mill is expected to be running by the 1st of Oct.

SPRING VALLEY DISTRICT.

A LEDGE DISCOVERED.—*Silver State*, July 22: We learn that a large ledge has been discovered on the mountain, above the Eagle mine, in Spring Valley. We are informed that it is 15 ft wide, and that it contains very rich gold-bearing quartz. It has been named the Nugget. Specimens of the ore assay from \$300 to \$5,000 in gold to the

ton. In early days a large quartz boulder, which was studded with gold, was found under where the ledge has been discovered. The boulder created considerable excitement among prospectors, who spent weeks looking for the ledge from which it was supposed to have broken off, but their labors were in vain. The impression now prevails that the Nugget is the ledge of which they were in search, and that it will prove to be a very valuable mine.

NOTE.—A contract to sink 100 ft on the Eagle mine, owned by the Vandewater company, a new corporation, has been let. The papers have been drawn up, and as soon as they are signed by the Superintendent of the company the contractor will commence sinking.

TUSCARORA DISTRICT.

MINING NOTES.—*Eureka Sentinel*, July 20: We learn that the mines in this district are generally looking better than they have for some time past, and there is noticeable a more cheerful feeling among the business men than has been seen since last winter.

MILL NOTES.—By the 1st of August, we are assured, that all of the mills in the camp will be supplied with ore as follows: The Independence-Navy mine, with 100 tons; the Lancaster mill with Argenta ore, the Grand Prize 20-stamp mill, 10 stamps with ore from the Grand Prize mine, and 10 with North Bells Isle ore. The De Fries mill will be employed to run Belle Isle tailings.

WHITE PINE DISTRICT.

TRENCH CO.—*Eureka Sentinel*, July 22: Quite a force of men is now at work on the mines of this company. A contract has been let the past week on the shaft of the Trench mine, while work is being rapidly pushed in the drift. At this stage of development everything looks encouraging. The mine is under able management, and the wonderful richness of the ore is such that even a small chamber makes quite a bonanza.

HADEKE STATE.—A contract has been let on this mine, where an incline is to be sunk 150 ft on the hanging wall of the vein. A crosscut is then to be run back to the footwall to determine the width of the ledge, which is undoubtedly the largest in this part of the State. Recent assays from a point about 40 ft from the surface show a great improvement in this quality of the ore as depth is attained.

RECONITOR.—Men are soon to be put to work on this mine, which also displays a fair vein of quartz ore.

CON. TREASURER.—*News*, July 22: The shaft of this mine is now down 50 ft, and is in favorable ground. WARD BECHER.—The Ward Becher folks have reduced their working force, though, we learn, that the prospects in this mine are most excellent; in fact, good enough to encourage any company.

ARIZONA.

TOMBSTONE DISTRICT.—*Nugget*, July 15: The recent strikes in 2 of our mines, the Empires and Contentment, are a cause of congratulation to all the residents of the district. The strike in the Empires was made at the depth of 213 ft, disclosing an ore body of unknown width which assays from \$200 to \$300. In the Contentment, at a depth of about 300 ft, a fine body of ore was encountered. Of its extent and richness we have not heard, but understand it is all that the owners of the property could hope for. This mine lies northwest of the Empiro, and it is quite probable that the ore body encountered is a continuation of that reached in the latter. In addition to these 2 strikes, we hear it rumored that in 1 of the prominent mines on the hill, the ore is rapidly gaining in richness, and the owners are giving promise of going to gold.

MOUNTAIN MOUNTAINS.—We are assured that Gen. Ben Butler is extensively interested in mining property in the Mule mountains. His recent visit to the Pacific coast was undertaken with the intention of visiting this section, but business interests recalled him to Massachusetts. Col. Strong, of Washington, D. C., is interested with him and left here during the present week for the East, to make arrangements for the development of the property, and the erection of reduction works. It is the purpose of the company to commence operations there within the next month or 6 weeks. Gold is said to be the predominant ore in their mines, so far as developed.

GLOBE DISTRICT.—*Silver Belt*, July 17: The winze, at a depth of 150 ft from the surface, in the Mack Morris, is yielding as rich ore as when the bonanza was struck. The 240 ft level, is widening and giving \$300-ore. The drift on the vein from the winze shows the same character of rich ore. The discovery is remarkable and indicates permanence.

STONEWALL NO. 1.—Geo. H. Cook, who, the present week, visited the Chamberlin, or Stonewall No. 1, brings favorable reports in regard to it. He thinks it 1 of the mines of the district. The new shaft is down 50 ft and all in ore.

OREGON.

JACKSON COUNTY NOTES.—*Democratic Times*, July 23: Barkdell & Kline struck another rich pocket of quartz in their mine at Blackwell the other day. The rock pays well, \$18 in gold having been obtained from about 500 lbs crushed in their arastra. The ore was obtained from the same ledge discovered by them last winter, but some distance from the original place of discovery. They have been prospecting other ledges in the vicinity, some of which will pay for milling. Work has been commenced on the main ledge and it is proposed to keep the arastra busy.

ROOPE RIVER MINES.—Savage Bros., who have been plying near the banks of Rogue river during the last season, have suspended operations for the present. They have cleaned up about one-third of the ground washed off and secured good wages for their work.

WILLOW SPRINGS.—Egan, Schump & Co. have ordered a pump for their quartz mine near Willow Springs, which will enable them to keep the water out of the shaft. Drifting is being continued, with good prospects, some excellent rock having been taken out this week. The pulverized ore is being worked by rocker and yield well. The company will probably start their arastra soon again. Roten & Co. have their arastra in the Willow Springs district in operation and are crushing fair rock.

ITEMS.—The Sterling Co. will not clean up until the end of the season. The Squaw Lake Co. have reset their pile and are busily plying again. N. Schaefer & A. Trunk are now engaged in cleaning up the Falling claim on Jackson.

BAKER COUNTY.—*Bedrock Democrat*, July 21: There has been another rich discovery in quartz within the past few days, near Sutton creek, about 12 miles from this city. The discoverer has a 4-foot ledge, from which they have already taken out some fine specimens. We saw the first piece that was taken from the croppings, and it is the richest and coarsest quartz gold we have yet seen.

Origin and Classification of Ore Deposits.—No. 3.

[By PROF. NEWBERRY, in the *School of Mines Quarterly* for March.]

Superficial Deposits.

These include the accumulations of gold, stream-tin, platinum, gems, etc., which are obtained from the surface material, gravel, sand and clay, derived from the mechanical decomposition of rock masses through which metals or ores were sparsely distributed. Thus, gold usually occurs in small quantity in the quartz-veins of metamorphic rocks. By the erosion of these rocks, having been freed from its matrix, and that more or less perfectly removed, this gold is concentrated by a natural washing process similar to that employed by man, but on a grander scale. In the same manner, the oxide of tin, which is hard, heavy and very resistant to chemical agents, is distributed sparsely through granitic rocks or vein-stones; and where these have been eroded, the cassiterite remains in the alluvial deposits of streams, where it can be cheaply and easily collected.

Superficial deposits have probably furnished nine-tenths of all the gold that has been obtained by man, the greater part of the tin, all the platinum and its associated metals (iridium, osmium, etc.), and all the gems except the emerald, which in South America is obtained by mining. Thus, it will be seen that the surface deposits are scarcely less important, economically, than the others. The superficial deposits of gold are for the most part confined to the foothills or mountain ranges, and are the products of the erosion effected by ages of frost, sun, rain and ice, which are continually wearing down all the more elevated portions of the earth's surface. Shore-waves also, in some instances, have worn away the rocks against which they have beaten, and have produced accumulations of debris that contain gold, platinum, gems, etc., in sufficient quantity to be economically worked. When a beach deposit of this kind has been raised above the sea-level, it sometimes becomes convenient and profitable mining ground. On the coast of Oregon, at and above Port Orford, the beaches now yield gold, iridium, and osmium in sufficient quantity to afford profitable employment to quite a mining population; and in the Black Hills, the old Potsdam sandstone beach, formed by the beating of the Silurian sea upon cliffs of Laurentian and Huronian rocks traversed by auriferous quartz-veins, now constitutes what is there known as the "cement deposits," from which a considerable portion of the gold in this region is obtained. As has been mentioned, however, the chief supply of gold in all ages has come from the debris that have accumulated at the foot of mountain slopes. All mountain chains are composed of metamorphic rocks, and nearly all the mountain ranges of the globe are traversed by quartz-veins, in which are concentrated much of the gold that was originally finely disseminated through the sedimentary strata—conglomerates, sandstones, shales, etc.—now granites, schists, and slates.

By the lateral pressure that has metamorphosed the sedimentary rocks, and produced the segregation of the quartz-veins, great folds and ridges were formed, which, rising high above the general surface, act as condensers of moisture, and receive the most copious precipitation from the clouds. Hence on these mountain sides an enormous system of water-power is developed, which is spent in grinding up the rocks and transporting the debris to the bottom of the slope. Here it is further washed, sorted, and the gold locally concentrated to form the rich "placer" diggings. As no great skill or expensive mining machinery is required to work placer deposits, every man with good health, a pick, shovel, pan and stock of provisions may go into the business. Gold washing is the simplest, as it was probably the earliest, of all mining enterprises, and has at different times employed nearly the entire population of a district or country. It is not surprising, therefore, that it has resulted in the production of an enormous quantity of gold. It is evident, however, that most of the placers of the world have been already exhausted, and while the little-known continent of Africa promises to furnish a large amount of the precious metal from its "golden sands," we can hardly expect that the production of California, Australia and New Zealand will even be repeated in the world's history.

Unstratified Deposits.

These have been divided into: 1. *Eruptive masses*; 2. *Desseminated through eruptive rocks*; 3. *Contact deposits*; 4. *Stockworks*; 5. *Fallbands*; 6. *Impregnations*; 7. *Chambers*; 8. *Mineral veins*.

Of eruptive masses of metalliferous matter I must confess myself incredulous. Examples of these are cited in the crystalline iron ores of the island of Elba, those of Nijni, Tagilsk in Russia, and in Sweden, and even the iron ore-beds of Lake Superior and Missouri. As late as 1854, this was the view taken of our crystalline iron ores by Whitney in his *Metallic Wealth*; but great advances have since been made in our knowledge of these deposits, and it is now generally conceded that all our crystalline iron ores are simply metamorphosed sedimentary beds. The evidence is accumulating that those of the old world have the same character. Prof. Otto Torell, the Director of the Geological Survey of Sweden, recently told me that he had visited all but one of the iron districts of Sweden, had found in all these the iron ores were metamorphic, and he had no doubt that

those yet unexamined were of similar nature. Where metamorphic action has been peculiarly violent, the beds of iron ore have been more or less dismembered, and perhaps in some instances have been actually fused; but that any bed of iron ore is the result of an eruption from the interior of the earth, is scarcely to be credited.

The examples of the occurrence of metalliferous matter disseminated through eruptive rocks are by no means uncommon, and the amygdaloid traps of Lake Superior, in which the cavities formed by gases have been more or less perfectly filled with copper, suggest themselves at once. Pyrites, magnetic iron and platinum are found sparsely diffused through trap-rocks, and are sometimes concentrated in such a way as to form valuable deposits when the trap decomposes.

Contact deposits are usually understood to be accumulations of metal or ores along the planes of contact between two strata; and the sheets and strings of copper which are concentrated at the junction of the trap and sandstone in some parts of the south shore of Lake Superior constitute illustrative examples of this class of mineral deposits. There is, however, considerable diversity in character among the deposits grouped under this head; the chief distinction being that in some cases the ore or metal has been segregated from one or the other of the strata at the time of their deposition, and in others it has come from a foreign source, and has been deposited in a more or less continuous sheet in cavities formed between the surfaces of the adjacent rock-beds. To the second of these classes would seem to belong the argentiferous ores of Leadville, Col. These are deposited along the plane of junction between an underlying limestone and overlying porphyry, and undoubtedly accumulated in vacant spaces formed by the solution of the limestone. These ore bodies have apparently much in common with the pockets and chambers excavated in certain limestone beds, and subsequently filled with ore, to be described farther on. The true structure of these Leadville ore bodies can, however, only be accurately learned when they shall be penetrated below the zone of unchanged sulphurets into which they will undoubtedly merge in depth.

The term *stockwork* is applied in the old world to a mass of rock or veinstone penetrated in all directions by small intersecting sheets or veins in such a way that the whole mass is mined out. Some examples of this kind of deposit may be found in most of our mining districts; but the most important which have come under my observation are in the Quirrh mountains, in Utah, and at Silver Cliff, Col. In the first of these localities, beds of quartzite—in the second, of porphyry, have been shattered, and the crevices between the fragments have been filled with ore deposited from solution.

The name *Fallband*, or rotten layer, originated in the silver mines of Kongsberg, in Norway, where there are parallel beds of rock impregnated with the sulphides of iron, copper, zinc, etc., which, by their decomposition, have rendered these beds so soft as easily to be removed. We occasionally meet with pyritous rock in this country, which decomposes in the same way, but none yet known to me has any considerable importance as a metalliferous deposit.

Impregnations may be defined to be saturations of porous rock with a mineral solution or vapor from which ore has been deposited. The cinnabar which is sometimes found impregnating unchanged or metamorphosed sandstone is generally cited as affording typical examples of impregnations. In such cases, which occur in California and South America, the deposit of ore has been ascribed by some writers to vapors, by other to solution, and it would seem that the latter is the more creditable theory, although the vaporization of mercury is easily effected, and, like other metals, it may be transported by steam, as we have proof at the geysers in California. More familiar and satisfactory exhibitions of impregnation are, however, afforded by the copper-bearing sandstones of Lake Superior, New Jersey, and New Mexico, and the silver-bearing sandstones of Silver Reef, in southern Utah. In all these cases, it is evident that a porous rock was once saturated with metalliferous solution, from which in the Lake Superior region, metallic copper was precipitated; in New Jersey and Mexico, sulphides of copper and iron; at Silver Reef, sulphide of silver. As such repositories of the metals are easily penetrated by surface water and air, we usually find the sulphides decomposed to a considerable depth; the copper ores converted into carbonate and silicate, the sulphide of silver into the chloride.

WAGES OF FARM LABORERS.—The annual report of Col. Wortington, Statistician of the Agricultural Department, just made public, gives some interesting facts concerning farm labor and wages. In the Pacific and mining States and Territories the range of wages for farm laborers, without board, is between \$30.75 in Montana and \$22.50 in Washington Territory. Of the States east of the Missouri, Minnesota pays her farm laborers better than any Northern State, the monthly wages, with board, being \$16.75, while Vermont pays only \$12.60. In the Southern States prices paid range from \$12.26 in Louisiana to \$7.32 in South Carolina, the average being \$9.60. The cost of keeping a laborer for the average of the whole country in 1880 is \$7.17 per month against \$7.25 in 1879. The demand for laborers is good in all sections of the country.

The Bottom of the Sea.

The coast survey steamer *Blake*, commander, J. R. Bartlett, U. S. Navy, recently returned from a cruise taking soundings, serial temperatures, etc., in the course of the Gulf stream, under instructions from C. P. Patterson, superintendent of the Coast and Geodetic Survey, has brought some very interesting data in regard to the depths of the western portion of the Caribbean sea. The depths and temperatures obtained last year in the Windward passage, between Cuba and St. Domingo, were verified, and a few hauls of the dredge taken directly on the ridge in this passage. The data obtained render it very probable that a large proportion of the supply for the Gulf stream passes through this passage, and that the current extends in it to the depth of 800 fathoms. A few lines of soundings with serial temperatures were run from Jamaica to Honduras bank via Pedro and Rosalind banks, and it was found that the temperature of 39½ degrees, obtained at all depths below 700 fathoms in the Gulf of Mexico and western Caribbean, could not enter through this portion of the sea. But the temperature at the depth of 800 fathoms on the ridge in the Windward passage, between Cuba and Hayti, was found to agree with the normal temperature of the Caribbean and the Gulf of Mexico, viz., 39½°. Soundings were taken between Hayti and Jamaica, developing a general depth between these islands not exceeding 800 fathoms, except when broken by a remarkably deep channel connecting the waters of the main Caribbean south of St. Domingo with those north of Jamaica. This channel runs close to Hayti with a greatest depth of 1,200 fathoms, and a general depth of 1,000 fathoms. Its course is northerly along the western end of Hayti, where it does not exceed a width of five or six miles; thence westwardly, south of Navassa island, with a tongue to the northward between Navassa and Formigas bank, and another to the westward between Formigas bank and Jamaica.

A line of soundings was run from St. Jago de Cuba to the east end of Jamaica, where a depth of 3,000 fathoms was found 25 miles south of Cuba. This deep place was found by subsequent soundings to be the eastern end of an immense deep valley extending from between Cuba and Jamaica to the westward, south to the Cayman islands, well up into the Bay of Honduras. The Cayman islands and the Misteriosa bank were found to be summits of mountains belonging to a submarine extension (exceedingly steep on its southern slope) of the range running along the southeastern side of Cuba. The deep valley is quite narrow at its eastern end, but widens between the western end of Jamaica and Cape Cruz, where the soundings were 3,000 fathoms within 15 miles of Cuba, and 2,800 fathoms within 25 miles of Jamaica. Near Grand Cayman the valley narrows again, but within 20 miles of this island a depth was found of 3,428 fathoms. The deep water was carried as far as a line between Misteriosa bank and Swan islands, with 3,010 fathoms within 15 miles of the latter. On a line between Misteriosa bank and Bonacca island there was a general depth of 2,700 fathoms, and a depth of over 2,000 fathoms extended well into the Gulf of Honduras. Between Misteriosa bank and Chinchorra bank the soundings were regular at 2,500 fathoms. North of Misteriosa and Grand Cayman to the Isle of Pines and Cape St. Antonio the soundings were generally 2,500 fathoms. The serial temperatures agree, in relation to depth, with those obtained in the Gulf of Mexico by Lieutenant-Commander Sigbee, and in the eastern Caribbean by Commander Bartlett; decreasing from the surface to 39½° at 700 fathoms, or less, and constant at that temperature for all depths below 700 fathoms. At depths greater than 600 or 700 fathoms, the bottom was always found to be calcareous ooze, composed of pteropod shells, with small particles of coral. These pteropod shells, as noticed in previous expeditions by different nations, appear to be an important factor in the determination of the movement of great bodies of sea water. The ridge at the Windward passage is bare coral rock, and on the south side the pteropod shells were found to be much more numerous than to the northward of the ridge.

Soundings and serial temperatures being the special objects of the cruise, dredgings were only incidentally attempted, for the purpose of reconnoitering, as it were, the ground, and it was found that the area passed over was not nearly so rich in animal life as that in which dredgings were made last year under the lee of the Windward islands at the eastward of the Caribbean sea.

The development of the extraordinary submarine valley in the western Caribbean sea is a matter of great interest, considered as a physical feature. This valley extends in length 700 statute miles from between Jamaica and Cuba, nearly to the head of the Bay of Honduras, with an average breadth of 80 miles. Curving around between Misteriosa bank and Yucatan, and running along between Cuba and the ridge of the Caymans for a distance of 430 miles, with a breadth of 105 miles, it covers an area of over 85,000 square miles, having a depth nowhere less than 2,000 fathoms, except at two or three points (the summits of submarine mountains), and with the greatest depth, 20 miles south of the Grand Cayman, of 3,428 fathoms, thus making the low island of Grand Cayman, scarcely 20 ft. above the sea, the summit of a mountain 20,568 ft. above the bottom of the

submarine valley beside it, an altitude exceeding that of any mountain on the North American continent above the level of the sea, and giving an altitude of the highest summit of Blue mountain, in Jamaica, above the bottom of the same valley, of nearly 29,000 ft., an altitude as great probably as that of the loftiest summit of the Himalayas above the level of the sea.

For the despatch portion of this great submarine valley the Superintendent of the Coast and Geodetic Survey has adopted the name of "Bartlett Deep."—*Iron Age*.

What is Water Gas?

The popular idea of water gas is that it consists of oxygen and hydrogen, and is formed by the decomposition of water. What it is, Dr. Wahl thus very clearly explains:

"Water gas may be defined to be the gaseous product resulting from the inter-action of steam and carbon at a high temperature. Generally speaking, the mode of its manufacture is to pass steam through a thick layer of glowing coal. The result of this procedure will be very easily understood by reference to the following explanation: The glowing coal (carbon) seizes upon the oxygen of the steam, uniting with it to form carbonic acid and liberating hydrogen. The carbonic acid thus formed is, however, obliged to pass through a considerable layer of glowing coal (carbon) before it can escape, and this carbon has so strong an affinity for oxygen that it deprives the carbonic acid of one equivalent of its oxygen, reducing it to the state of a lower oxide of carbon. The product which results from these several reactions is 2 equivalents of hydrogen and 2 equivalents of carbon oxide; or, expressed in chemical language, 2H + 2CO. This product is what is known as water gas. It is incorrect to assert that any positive gain in heating effect is obtained by this process, for the energy expended in the process of decomposing the water is precisely equal to the additional heat given out by the combustion of the water gas over what would have resulted from the combustion of the carbon alone. On theoretical grounds, therefore, there can be no economy in the process; but there is a gain in practice, and this is due to the fact that the combustion of a gaseous fuel can always be effected with greater economy in our furnaces, stoves, etc., than that of a solid fuel. The gain, therefore, is to be ascribed to the physical condition of the fuel, and not to any advantage resulting from the chemical reaction that has taken place. This is a very common error that is entertained even by otherwise well-informed persons. We look upon the future of water gas as highly promising. With its aid it is made possible to produce illuminating gas more cheaply than by any other process, by simply enriching it with the vapors of petroleum, or of other substances rich in illuminating elements. But the grand field of water gas for the future will lie in filling the place of a fuel for industrial and domestic uses to take the place of coal. We think the time is not very remote when water gas will be distributed to our houses just as coal gas is now distributed—when coal and wood fires, with their abominations of dirt and ashes, will only be known as things of the past."

The unscientific, as well as the scientific, world is interested in the discussion of the relative merits of the new water-gas systems in comparison with the old coal-gas systems. The old theory, promulgated by scientific journals and those claiming to be scientific writers, was that water gas could not be produced in any form economical enough for general use. But it now appears that these gentlemen were laboring under a mistake. Several methods or systems of producing water gas have of late been introduced with marked success. These new methods are being brought into competition with the old coal-gas system, and the public will have a chance to observe the result.

Yonkers, N. Y., is to be favored with the opportunity of observing a contest between the two systems on quite an extensive scale. Not only will they have a chance to compare the old with the new, but there will be a rivalry between several of the new systems, so that they can determine, if possible, whether water gas is better than coal gas, and which of the water-gas systems is the best.

The *Engineering and Mining Journal* says in regard to the interesting contest: The Motay and Lowe systems are spoken of in the highest terms. The contest now going on in Yonkers will be productive of good, not only in showing up the relative merits of the different processes, but likewise their deficiencies, if any exist. Such close competition begets improvement, and the new methods will at the outset have the advantage of the severest tests in a practical manner. If it is demonstrated that the new gas is cheaper and better than the old, then it will not require much time to introduce the same quite generally in the principal cities of the country.—*Iron Age*.

INSECURITY OF AMERICAN BRIDGES.—Prof. George L. Vose, in the *Railroad Gazette*, says that 30 bridges, on an average, break down in the United States every year. No system of inspection or control at present existing has been able to detect in advance the defects in these structures, or to prevent the disasters. A system, practical, simple and inexpensive, can be had, which, if properly carried out, will insure in nearly all cases, if not all, the public safety. It lies with the public to say whether or not it will have such a system.

The Nicaragua Inter-oceanic Canal.

The full text of the inter-oceanic canal concession granted by Nicaragua to the American provisional society has been received at Washington. It is signed by Don Adam Neordenas, Minister of Foreign Affairs, and A. G. Menocal, a member and commissioner of the provisional society. The concession has been ratified by the Nicaraguan Senate, and published as a law by the republic. The provisional society secures the exclusive privilege to construct a ship canal across Nicaragua, the canal to be of sufficient dimensions to accommodate steamers of the largest class used between Europe and America, and the locks are to be not less than 500 feet long and 28 feet deep. The concession is for 99 years from the date of the opening of the canal for general traffic, and at the expiration of that period the Nicaraguan government is to take possession of the canal in perpetuity, with the right reserved to the company to lease it for another 99 years. During the period of concession the company is to have the privilege of constructing a railway along the whole or any part of the canal, also such telegraph lines as it deems necessary for the construction and working of the canal, and these lines shall transmit public messages free of charge. The government of Nicaragua will declare terminal ports. The canal itself throughout its length is to be neutral, and transit in case of war between other powers and Nicaragua shall be uninterrupted. In general the canal shall be open to the free navigation of all vessels, provided they pay dues and observe the regulations of the company. Troops of foreign nations and vessels of war will be allowed to pass through the canal under the regulations of the existing treaties. Vessels of war belonging to other nations engaged in hostilities with Nicaragua or any other republic of Central America will be rigorously excluded. An effort will be made to secure a guaranty from all the powers of the neutrality of the canal, of a zone along it and of a zone in the vicinity of the terminal ports where the dimensions will be defined. This concession with all its advantages and privileges will appertain to the construction company and is transferable only to a company which is to be organized by the provisional society, and in no case can it be transferred to a foreign government or power. It is to be organized in the usual manner of such enterprises, with its principal office in New York, or where it may deem most convenient. Its designation will be "The Nicaraguan Ship Canal Company." The company is to be allowed to bring immigrants to Nicaragua freely from all parts of the world, but it is required to bind itself not to interfere in questions which directly, or indirectly, may affect the public peace of Nicaragua, and not to give protection to criminals or disturbers of the peace. It is exempt from every form of taxation during the period of this concession.

A Steam Catamaran.

The steam catamaran built at Nyack, on the Hudson, by William Voorhis, was launched on the 7th inst. The two hulls are cylindrical in shape, very much resembling two immense cigars. They are constructed of 3-16-inch iron plates, are 200 ft. in length and 5 ft. 6 inches in diameter at their largest part, tapering to a sharp point fore and aft. They are 9 ft. apart, connected by means of white pine beams resting on white pine caddles. They are kned by back-mast knees and braced by iron braces on the inside and outside, thus furnishing a deck 25 ft. in width over all. All this is enclosed, making a commodious and pleasant cabin almost its entire length, with a small open-deck space outside fore and aft. The rudder-posts—one to each hull—come up through sleeves 20 ft. forward of the extreme after part of the hulls, and playing under them. The rudders themselves are 2 ft. deep and 6 ft. in length, constructed of thin iron. The rudder-post is secured to them 2 ft. abaft the forward end. They are geared together at the top, and both are worked by one wheel, the pilot-house being in the usual location, above the forward cabin. The steamer is to be propelled by a Wells balance engine of 476 horse-power, having a cylinder 24 inches long, 12 inches in diameter with a stroke of 12 inches. The shaft is of steel 4 inches in diameter, 8 ft. long, and is placed on an incline giving the boat an upward and forward movement. It is expected to make 325 revolutions a minute. The engine is supplied with steam by a Herreshoff coil boiler 8½ ft. long and 8½ ft. high, containing 1,250 ft. of coil. The propeller is six-bladed, 8 ft. in diameter, and graduated from 7½ to 8½ ft. pitch. The hub is out of water, as are also four of the six flanges. The whole boat is 42 tons burden, with a displacement of 72 tons, and it only draws 2 ft. of water. Thos. Magee, of Nyack, is the builder, and the cost of the boat is about \$15,000. Commodore Voorhis has determined to name her *Henry W. Longfellow*. He expects to run her as a ferry between Nyack and New York, and is confident she can make the run—28 miles—in one hour. *American Manufacturer.*

THE METRIC SYSTEM.—The metric system became obligatory on the 15th inst. in the kingdom of Spain and all its colonies. The Turkish government has also ordered the introduction of this system into all its provinces, including Tripoli and Arabia. The cubit gives way to the meter in Jerusalem, and the shekel to the kilogram.

USEFUL INFORMATION.

LIQUID GLUE.—You cannot use mucilage as glue, because it is not gln and does not possess the sticking qualities of good glue. It is made of starch, dextrine or gum arabic, with some acetic acid, or some equally preservative substance in it to make it stick on tin cans or on metal. You must mix a few drops of nitric acid with the mucilage just before you are about to use it, otherwise it will come off. This acid acts on the metal and destroys the polish, which prevents the sticking. It is the same with varnished objects. In order to make labels stick where they have a tendency to come off, mix a little alcohol with the mucilage. This partially dissolves some of the varnish, takes the gloss away under the label and causes adhesion. Or you can rub the varnish with a little alcohol at the place where the label is to be put on; or you may stick the label on with varnish instead of mucilage. Some kinds of varnishes are good for this purpose, others not. In order to make a better sticking mucilage, you must not use starch or gum at all, but the best quality of glue. Soak it over night in plenty of water; in the morning pour the excess of water off and put on a gentle fire, so as to melt the glue in the water it has absorbed during the night; but thin it with strong vinegar, or with acetic acid, when you want it thick, and you will have mucilage with which you can glue wood together, but you must not expect that it will be as strong as if you had used hot gln, as cabinet-makers always do.

EDGE-LAID BELTS.—According to Leigh, a better method of producing a broad belt than the usual American double leather belting sewed together—a method by which the article can be made with the greatest ease, of any thickness or width, perfectly equal in texture throughout, and alike on both sides—consists in cutting up the hide into strips the width of the intended thickness of the belt, and setting them on edge, these strips to have holes punched in them about one-eighth of an inch in diameter and one inch apart; nails, made of round wire, clinched up at one end for a head and flattened at the other, are used for fastening the leather strips together. Each nail is in this case half the width of the intended belt, and after the strips are all built upon the nails, the ends of the latter are turned down and driven into the leather, thus making a firm strap without any kind of cement, splices, or similar treatment. When a strap made in accordance with this plan requires to be tightened, it is only necessary to take it asunder at the step lines of the splice, cut off from each end of the strap what is required, and piece up again with wire nails or laces, going entirely through the strap.

LEATHER FROM SHEEP'S STOMACHS.—An American inventor has devised a new mode of utilizing a waste material of which a plentiful supply exists everywhere, but of which Australia produces perhaps a larger proportion than any other country. He has succeeded in making a very good, light, fine leather from sheep's stomachs, or rather from the middle membranes of the stomach. The mode of preparation, according to *India and the Colonies*, is to carefully remove both the inner and outer coatings, when a thin, white, skin-like material is produced, which is subjected to a mild process of tanning by means of a mixture of alum, glycerine and yolk of eggs mixed with flour into a paste. The paste is spread over the material and allowed to remain for about a day, when it is removed and a small quantity of linseed oil rubbed into the resultant "leather."

TO MAKE COURT PLASTER.—Soak isinglass in a little warm water for 74 hours; then evaporate nearly all the water by gentle heat; dissolve the residue in a little dilute alcohol, and strain the whole through a piece of open linen. The strained mass should be a stiff jelly when cold. Now stretch a piece of silk or sarson on a wooden frame, and fix it tight with tacks or pack thread. Melt the jelly and apply it to the silk thinly and evenly with a badger-hair brush. A second coating must be applied when the first has dried. When both are dry, apply over the whole surface two or three coatings of balsam of Peru. Plaster thus made is very pliable, and never breaks.

IMPURE WATER IN LOCOMOTIVES.—Some of the difficulties encountered in the use of impure water in locomotives in some of the Western States may be formed from the following letter from a Western mechanic: "At the end of the road we have so much alkali water to contend with that we are obliged to change the flues every six months. Besides this, we have to wash our engines thoroughly for every 400 miles run, with a force pump and 70 lbs. of pressure, and even with all this constant cleaning the flues will not last longer than six months without giving much trouble from leaking on account of the mud and scale."

DRAWING PAPER of any thickness may be made perfectly transparent, so that it may be used for tracing, by dampening with benzine. As the benzine evaporates the paper again becomes opaque. The tracing may be done with India ink or water colors.

WITHERED LEAVES having the yellow, brown or red autumnal colors can be made green again by steeping them in water with a little zinc powder.

FIREPROOF PAPER.—To make a fire and water-proof paper, *Les Mondes* says: Mix one-third of ground asbestos fiber with two-thirds of paper paste in a solution of common salt and alum. Pass the mixture into a machine, plunge the paper thus made into a bath of dissolved gum lac and send it through the finishing rolls, when it may be cut into sheets. The salt and alum increase the strength of the paper and its resistance to the action of fire. The lac renders it impermeable to moisture, without interfering with its fitness for the reception of ink.

TO WELD HORN OR TORTOISE SHELL.—The worker should be supplied with pincers or tongs of different sizes and forms, so that when applied to the joints to be made, the tool will reach three or four inches beyond the joint. The edges to be joined are filed to a bevel or lap-joint, care being taken to have them quite clean and free from grease. The edges are joined after being wet with water, the pincers applied hot, and followed with water. By this procedure, the shell will be found to be joined as if it was one piece.

A COMPANY, lately organized in Baltimore, is engaged in exporting baled manure. Use is made of half a dozen such presses as are employed in compacting cotton. The manure is made up into parcels resembling bales of hay, and when the parcels are covered with burlap bagging they look as well as do packages of dry goods. The manure is shipped to North Carolina, Virginia and other States, and to Cuba.

REMOVING HARD PUTTY.—Hard putty, it is said, can be removed from a window-sash with great readiness by simply applying a piece of heated metal, such as a soldering iron or other similar instrument. When heated—but not red-hot—the iron is to be passed slowly over the putty, which is thereby rendered so soft as to be easily parted from the wood.

CEMENT FOR IRON AND STONE.—A mixture of litharge and glycerine hardens rapidly, and is said to make an excellent and durable cement for iron or stone work. It is not affected by exposure.

TO TAKE MARKING INK OUT OF LINEN.—A saturated solution of cyanuret of potassium, applied with a camel's-hair brush. After the marking ink disappears, the linen should be well washed in cold water.

A DELICATE INSTRUMENT.—One of the most delicate instruments known to science is Edison's tasimeter, or heat measure. The rapid passage of the hand before it at a distance of 34 feet causes a deflection of the needle of 20°.

GOOD HEALTH.

New Method of Prolonging Life.

We have had several letters about a book entitled "Makrobistic and Eubank," a scientific method of prolonging human life. We have not yet been able to procure a copy of the work. It is to be had only in the German language. It is not to be found in our book-stores; but a London paper has reviewed it and states that one of the secrets promulgated in this remarkable work is that long life will be reached by continually increasing the use of lemons. After arriving at 40 years of age, the prescription is two lemons per day for a lady, and three for a gentleman, increasing the dose every ten years as long as the person lives. It is said that the author got his idea from the fact that Count Waldeck reached the age of 120 years, and that for years he had eaten a large amount of horse-radish soaked in lemon juice as an antidote to the sluggishness of his liver. It would take more than one experiment to prove the truth of this remarkable history; still there is no doubt that the use of lemon juice may be very beneficial for those who are advancing in age, providing it does not disagree with the stomach. It would certainly have a tendency to thin the blood to some extent, and this would render it easy for the heart, which grows feeble as age advances, to circulate it. Other means of prolonging life might be equally beneficial. As a rule, the older one grows the less fruit he eats, partly from the fact that the teeth become imperfect, and it is difficult to masticate them; but it is evident to us that fruit in proper quantities may be used to great advantage by well persons as well as sick ones. —*Herald of Health.*

[The lemon should be used much more freely than it is. It is recommended by medical men everywhere; and if the treatise of this German professor of medicine, for such he is, will only render its use more general, it will accomplish a good work. The time is fast coming when, by more general cultivation, the lemon and lime will be offered so cheap that they may be freely used in every household. California and Florida will eventually supply the entire country with the choicest of all the citrine fruits.]

Does Eucalyptus Prevent Fever.

In the last number of *Nature* some very positive statements are made as to the value of the eucalyptus or blue gum tree of Tasmania in destroying fevers in malarial districts. The testimony in support of this power, it says, is most convincing. In malarial districts near eucalyptus forests fever seems to be unknown, and in parts of Corsica and Algeria, where the tree has been planted for the sake of its reputed virtues, endemic fevers have been stamped out. M. Gimbert, in a report to the French Academy, instanced the case of a farm situated in a pestilential district about 20 miles from Algiers, where by planting a number of trees the character of the atmosphere was entirely changed. Similar testimony comes from Holland, the south of France, Italy, California and many other parts of the world as to the febrifugal attributes of this tree.

In no case is the evidence more convincing than in that of Algeria, as related by Dr. Santra, and quite recently, by Consul Playfair. Large tracts of land have been transformed by the agency of the "fever-destroying tree," as it has come to be called, and wherever it is cultivated fevers are found to decrease in frequency and intensity. Fewer districts in Europe have a more evil reputation than the Campagna as a veritable hot-bed of pestilential fever, and the people who know the country around Rome may remember the monastery at Tre Fontane, on the spot, as the tradition tells, that St. Paul met his death. Life in this monastery meant death to the monks, but since the eucalyptus has been planted in the cloisters fever has disappeared and the place has become habitable.

INFECTION FROM MOSQUITOES.—The discovery that mosquitoes carry filaria in their probosces, and infect the human subject with that much dreaded worm parasite, has attracted considerable attention among the English Microscopists. The matter has been brought before the Quekett Microscopical Club, by Dr. Cobbold, the President, who is one of the highest authorities on this subject. Particulars of various cases were given in which it was proved that those suffering from filaria had received the contagion from mosquitoes, and mosquitoes themselves infected with filaria were shown. Filaria are very minute worm-like parasites, which on entering the human body, breed until they increase to countless numbers. By recent advices we learn they have the power of entering and leaving the blood at pleasure; they usually invade the circulation about seven o'clock in the evening, and increase until about midnight, after which time they retire to other parts of the system.

CROSSNESS AND IRRITABILITY.—Much of the crossness, irritability and general unamiableness which characterize certain children and make their presence so annoying springs from neglect of their happiness in some direction. Either from indiscreet indulgence, undue severity, or careless negligence, their physical system is out of order, or their temper is soured, and, feeling uncomfortable, they naturally vent their discomfort upon others. In describing a young child the words "good" and "bappy" are almost synonymous, and no effort to make him the former can be successful as long as the latter is neglected.

IMPORTANCE OF SOUND REST.—Nothing gives more mental and bodily vigor than sound rest when properly obtained. Sleep is our great replenisher, and if we neglect to take it regularly in childhood, the result will be all the worse for us when we grow up. If we go to bed early, we ripen; if we sit up late, we decay; and sooner or later we contract a disease called insomnia, or sleeplessness, allowing it to become permanently fixed upon us, and then we begin to decay, even in youth. Late hours are shadows from the grave.

AFTER THE PHYSICIANS.—The New York Legislature has passed a law requiring the registration of all practising physicians. This law also compels a practitioner of medicines coming from another State to prove his standing before the faculty of a New York medical college. Physicians in good standing do not complain of this law. In fact, they did a good deal to get it passed, as a protection to the profession against empiricism. Human life is too valuable to be trifled with, and no means can be too rigid which are devised for its protection. In this view, the New York law will meet with general approval.

DRINKING BLOOD.—It is said that between 200 and 300 men and women of St. Louis drink daily from a half to a pint of blood piping hot from the veins of slaughtered cattle. More blood drinking by consumptives and aged persons is done in September and October than during the remainder of the year. The blood of young steers is the best, and should be caught as it comes from the animal, and should be drunk while the foam is still on and the steam rising. Consumptives are advised, in addition to drinking the blood, to sit in a slaughter-house for a couple of hours each day at killing time to imbale the "steam" of the running blood.

BEEFSTEAK chopped up fine and baked with flour and yeast in the form of a "meat-bread" loaf is the latest dietetic sensation. It is asserted that meat thus treated entirely disappears during the process of purification, the nutritive principles becoming incorporated with the bread.

MINING SCIENTIFIC PRESS

W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:
Saturday Morning, July 31, 1880.

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The Week.

Since our last issue the city has been visited
by two distinguished members of President
Hayes' cabinet—Mr. Carl Schurz, Secretary of
the Interior, and Mr. R. W. Thompson, Secre-
tary of the Navy. Apart from the desire for
relaxation and recreation, and the demands of
politics, we presume the visit of these gentle-
men has reference to the business of their de-
partments; and it is to be hoped that both of
them will gather knowledge which will be of
service to the country at large and to Califor-
nia in particular. They are entitled to the
kindest consideration.

A memorable incident has occurred in the
city during the week. On Wednesday, Sir
Thomas Hasketh, an English gentleman on a
tour of pleasure, on learning of the probable
condition of the crew of the foundered ship
Mathilde on the island of Socorro, almost at a
moment's notice dispatched his steam yacht to
the succor and rescue of the unfortunate cast-
aways. It was the graceful act of a humane
English gentleman, and will enlist the admi-
ration and love of men and women wherever
the noble deed is known.

The return of the census shows that the pop-
ulation of California, like that of every other
State, had been over-estimated. In this city
it was generally conceded that there were from
40,000 to 50,000 Chinese; and the majority in
the constitutional convention clearly acted on
the truth of that assumption when it voted to
exclude the Chinese from the apportionment for
representation. It now appears that the num-
ber of Chinese has been greatly exaggerated,
and that the percentage of Chinese to whites
is about 1 to 12. The proportion in several
other counties is much larger.

The news from many of the mining counties
of this State continues to be excellent. Re-
specting the Comstock mines, the latest advice
are encouraging, although the long-looked-for
developments have not yet been made. The
situation, however, is evidently improving.
According to the Gold Hill News the north end
is ripening for developments, while towards the
south the principal mines are progressing
towards a better condition.

The Condition of the Comstock.

The great Comstock appears to have lost its
prestige. Nearly every metropolitan journal
on the Atlantic side has indulged in vaticina-
tions as to the condition of the great lode, and
they see nothing but its inevitable collapse. They
have written Ichabod, and turned their faces in
other directions. Many of our own journals
have not done much better. They have as-
sumed, apparently, that the extraordinary diffi-
culties under which operations are carried on in
the principal mines of the Comstock have be-
come too great for the engineering skill and the
monetary strength of the coast, and that the
vast interest must succumb. Of course there
are many disagreeable truths in the record of
the Comstock mines. There is a long hiatus
since dividends were regularly declared and
paid. In many instances the management has
been reckless, to say the least. Assessments
have been levied and collected with a regularity
that is amazing, until the year's aggregate
presents a sum that is enormous. The reports
of the discovery of ore-bodies in any of the
mines upon which the hope or the faith of the
public was fixed, have been perfunctory and
altogether meager. And finally the great depth
of the leading mines; the extraordinary heat
arising from the high temperature of the water
and the imperfect ventilation of shafts and

But the situation of those mines is not, we
have reasons for believing, nearly so dismal as
has been generally represented. The great lode
has had its seasons of prosperity and adversity;
its times of depression and of reaction. People
will admit this, while they strenuously insist
that no cloud as dark as that which now lowers
upon it ever before so completely shut it out
from hope. This condition of mind results
surely from lapse of memory. Those people
forget the vicissitudes of fortune to which the
Comstock has been subjected. They seem not
to recollect the threatened collapse of 1865,
when the ore bodies began to show signs of ex-
haustion, and people left Virginia City by
hundreds. That memorable exodus partook of
the character of a stampede. Only one year
afterward important discoveries were made at
Gold Hill, and during several years thereafter
more than the old prosperity returned; mining
shares were active, and none doubted the Com-
stock. This good time lasted until about 1869,
when another period of depression set in, fol-
lowed by another flight of the doubters. Shortly
after this there came the splendid discovery of
ore in Crown Point and Belcher. The Com-
stock was voted immortal, and "high jinks"
was universal. Before the close of 1872 that
magnificent ore-body yielded to the drain of
dividends, and a sharp reaction followed those
bonanza days. This time the wolf had come.
When, lo! before the doubters had time to set-
tle down to enjoy the luxury of misery, Con.
Virginia produced such a boom as even the
Comstock had not known. The joy was as gen-
eral as it was sudden. Prosperity and happi-
ness walked hand in hand. Suddenly there

it, will yield nearly as large a profit as ore of
equal value found at 1,000 or 1,500 ft. The
extraordinary difficulties which are encountered,
such as extreme heat and vast volumes of
water, are met by unrivaled skill, energy and
means, and we do not doubt that they will be
overcome. Indeed, the temperature has al-
ready been reduced in the mines at the
north end, and will be generally mastered by
the perfect system of ventilation which is pro-
gressing. The heat has been the least difficulty
with which the engineers of the Comstock have
had to contend. How to check the inflow of
water, and how to lift it out, is the supreme
difficulty. We do not doubt that even that
problem will be successfully solved by the pa-
tience and skill of the experienced miners of
the Comstock.

Mineral King District, Tulare County.

[By J. W. A. WRIGHT.]

EDITORS PRESS:—A letter last summer gave
your readers some information about the ledges
and mines of the Mineral King district of
Tulare county. Its details were a record of
facts about a region of which little was then
known, and the facts were obtained from one of
its early pioneers. This sketch proposes to
give the results of some personal observations in
this remarkable and comparatively new mining
region of California, and is literally prepared on
the spot. The accurate map and an engraving
of one of its views which have been prepared to
accompany this account, will give your readers
a much more correct idea of numerous details
than any mere attempt at description could
possibly do.

For the better understanding of the engrav-
ing, the following explanation is necessary: 1
represents the upper tunnel of the Empire
mine, 3 is the Empire mill, 4 the town of Min-
eral King, 5 marks the smelting works of the
New England Co., where the former town site
of Beulah was located. You are looking east-
ward, the ravine in the middle is Monarch
canyon.

The map which Mr. P. Y. Baker (an experi-
enced and well-known surveyor of Tulare county)
has prepared covers about 20 square miles of
the principal part of the district, though its en-
tire extent, as first organized in September,
1873, is about 15 miles from east to west, by
the same distance north and south.

Though the "New England mining company"
did some work in this district by tunnel and
smelting works soon after its organization, all
their supplies were brought over the steepest
and most rugged of trails. Not till last year
was a road completed to this high region. By
the energy and perseverance of Thomas Fowler,
owner of the Empire mine, one of the most
promising claims upon its numerous ledges,
some 23 miles of road were completed during
five months of 1879, from April to August in-
clusive. Some of the greatest of natural obsta-
cles, and others, were overcome by this enter-
prise, at an actual outlay of not less than \$25,-
000 or \$30,000. Its completion has made easy
of access one of our highest and most precipitous
mountain regions, which undoubtedly abounds
in extensive ledges of various metals that must
eventually become valuable. More than this,
it has opened an almost *terra incognita* to the
tourist—whether pleasure seeker or student of
nature—which can be reached by comfortable
staging from Visalia in 14 hours, or by rail and
stage from San Francisco in less than 30 hours.

Location and Surroundings.

Being upon the very head waters of the east
fork of Kaweah river, among some of the high-
est mountains in California, the head waters of
Kern and King's rivers and the higher Sierras
around, Mt. Whitney can be more readily
reached by this route than by any other. A
trip with pack animals over safe trails, via
Farewell gap (see map), the little Kern,
the main Kern river and Whitney creek, makes the
top of Whitney itself easily accessible in a dis-
tance of about 60 miles from the town of Mineral
King. Of these advantages, future letters will
speak more fully.

As regards the exact location of the new
town of Mineral King, I am informed by Mr.
P. Y. Baker, who has run an important line
through the mountains, though no government
survey has yet sectioned the district, that it is
properly in Sec. 15, township 17 south, range
31 east. This makes its easting from Visalia
about 38 miles, its northing between 7 and 8
miles. Hence, in a direct line from Visalia,
it is about 39 miles, slightly north of east.

As regards the road, although its grade is
sometimes steep and its turns short, the road-
bed is as good and safe as in any of our mount-
ains. It has been put in thorough repair since
the serious injuries of last winter's storms.

Of the scenery presented at many points, we
can only ask space here to say it is extremely
grand and impressive, full of lofty, precipitous,
wild, deep, far-reaching views. Parts of it
vividly remind one of views along the Truckee,
the upper Sacramento, American river, Weber
canyon on the Overland route, and Alpine
scenery in Switzerland on the south side of Mt.
Gothard pass, where the great tunnel is being
made. But

The Subject of Absorbing Interest
Connected with Mineral King is its mines and
their successful development. Your readers
have already been informed that the ores of its



levels and drifts; the enormous and incen-
sant inflow of steaming water, the discharge of
which has severely taxed the most powerful
pumping machinery; all of these things have
combined to shake the confidence of even cool
and intelligent heads as to the practical question
of further successful mining on the Comstock.
These are some of the patent and disagreeable
truths which crop out of the last few years' his-
tory of the mines of the Comstock.

The very plans for the relief of the share-
holders of the mines, which have been suggested
at home as well as abroad, plainly indicate
either the loss of hope or the want of faith in
the revival of production on the Comstock.
Apart from the economy which would result
from co-operative working, the chief stress is
laid upon the utilization of the low-grade ores of
the mines. It has been proposed to extract
ores down to a specified depth at a rate of
wages to miners of about five-eighths of that paid
at present; and further, to devise a better
method than that now in vogue for their
cheaper and more thorough reduction. These
suggestions will beyond doubt be acted upon
some day. But before that time arrives, the
important question of the occurrence of bodies
of ore large enough and rich enough to pay the
enhanced cost of their exploration and extrac-
tion will have been practically and finally set-
tled. The bodies of low-grade ore which have
been passed over or cast aside in several of the
mines, be the aggregate amount great or little,
will yield few dividends to the holders of the
shares, and will induce fewer still to respond to
the call for assessments. That will practically
end large and productive mining on the Com-
stock.

came a tremendous blow from an unexpected
source, and brought gloom and foreboding. We
have no hesitation in saying that the disastrous
fire toward the close of 1875 was by all odds
the sharpest ordeal through which the fortunes
of the Comstock have yet passed. It was the
supreme shock to that great mining industry.
But it withstood even that. The unrivaled
ore-body in Con. Virginia and California con-
tinued to produce for some time, but exhaustion
waited upon the extraordinary output that was
necessary to pay that long series of splendid
dividends.

There have been no remarkable discoveries
since. But the history of the mines which we
have hastily sketched seems to us to warrant the
belief that valuable developments are likely to
occur any week. A cool head, familiar with
the history of the Comstock, will be slow to
believe that its glory has departed. Since the
discovery of the great lode there have been
half a dozen apparent collapses succeeded by as
many reactions or booms. It will hardly be
contended that the depth which has been
reached precludes the probability of further
discoveries of ore. No one doubts, we imagine,
that ore occurs at a great depth in Belcher, or
in one or two mines at the north end. Is it not
reasonable, and in strict accordance with the
history of all the large ore-bodies yet developed
on the Comstock, to believe that either of the
occurrences of ore specified may be the begin-
ning, the apex, of an ore-body in mass equal to
some of those found in the ground above? The
cost of working the mines at the increased
depth will be compensated in a large degree
by the improved machinery and the better
methods; so that ore found at 2,500 or 3,000

many ledges yield chiefly silver, lead, zinc, copper, antimony and gold, its mines being classed chiefly as silver mines. Many of its friends believe that its extensive veins are to become the future Comstocks and Virginias of this coast. Some miners contend that nothing but smelting will reduce these ores. This is no doubt true of the more "rebellious" forms which contain large percents of base metals. Others believe that there is much free milling ore here, of which that in the Empire mine is considered a fair type.

The New England smelting works, located in Harry's Bend, on the south side of the Kaweah, opposite the town of Mineral King, as shown on the map, are the only enterprise on a large scale for such reduction of these ores. For reasons not fully known, this costly experiment did not result satisfactorily, and these works have not been in operation for some time. Through Senator Fowler's exertions and influence,

A First-Class Silver Mill

Was erected so soon as the road was completed last fall. It was to work the Empire ore. The locations of this important mill and mine are shown on the map and engraving. The result of this experiment has been watched with much anxiety, as its success will largely develop the mining interests of Tulare county. Financial troubles intervened, and the heavy snows of last winter interfered. But it is cause for rejoicing among the friends of this valuable enterprise, that all these difficulties have now been removed, and mine and mill are again ready for active operations. The present Directors of this

Empire Gold and Silver Mining Co.

Are George W. Prescott, Walter N. Hawley, A. S. Halladie, Jacob S. Taher and Thomas

Harper considers this ore which comes from the greatest depth yet reached most similar to the Tuscarora and Northern Belle of Nevada, while the surface ore is more like the Comstock. As already mentioned in the Press, the average of nine assays made some 18 months since was \$121 silver and gold. Late assays, on which present opinions of the mine are based—opinions that have raised the value of its stock from nothing to \$20, give from \$20 to \$300 per ton silver and gold, of which the average amount in gold is \$4.

The Mill,

Which is now in first-class order, is in size and character like the Standard and Bulwer mills at Bodie, and the Mammoth mill. It has 15 stamps, 6 combination pans and 3 settlers, with 1 clean-up pan and settler. Its two engines consist of one 65-horse power for the pans and settlers, and one 35-horse power for the batteries. All this machinery is of the best quality, from Prescott, Scott & Co. The supply of wood and water for this mill and indeed through the whole district, is abundant. The total cost of the mill and all machinery to date is about \$200,000. There are so many objects of interest connected with this enterprise and its district, that further description of the mine, tramway, town of Mineral King, etc., must be reserved for a future letter, that your columns may not be overcrowded.

Various Assays and Work

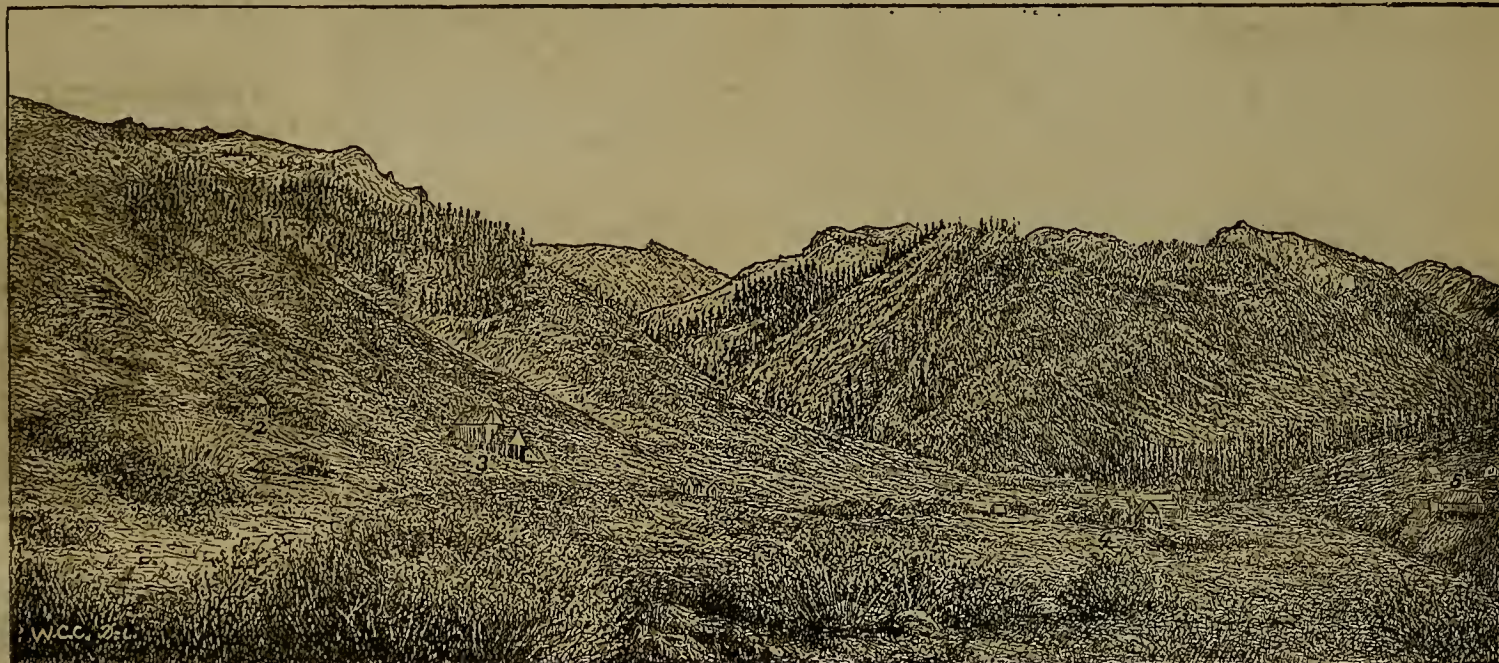
Of some ledges named on the map are as follows: Black Wolf, \$52 silver, \$12 gold, 48% copper; Chihuahua, from \$100 to \$500 silver, \$12 gold; average amount of lead, 60%, though it sometimes amounts to 70%; White Chief, \$28 to \$300, tunnel in 195 ft.; Dolly Varden, \$112 silver, 38% lead, two shafts down, one 27 ft., the other 30; Mammoth, over \$300 silver, and

Letters from the Comstock.—No. 5.

EDITORS PRESS:—We may be right on the edge of the boom now—who knows? Stocks are being held up to a certain notch, and though the purchasers are few, the market is not allowed to go back. To an observing man there can be no doubt but that there is little more to be done at the north end in the shape of preparation. The "good ready" they have been getting on is nil fixed, and the time has about arrived for work. It is the general belief that Mackay has been mending his armor, riveting the seams and fixing the joints, so that he can sail into the fray with confidence.

On Saturday a crosscut was started in Sierra Nevada on the 2400 level, somewhere about 1,000 ft. north of the incline. It is running east, and will expose virgin ground; and it is thought that the 2500 level of Union Con. has drained the ground through which the crosscut will pass, so that there is but little danger of water. There will be no crosscutting on the 2500 level until the 2400 is reached. When Mackay was asked about the operations, he simply replied: "Tell the impatient fools we are going for the ore as soon as we can." Some people expect that the ore-body should be fully developed and ready to take out before any provision is made for the handling of water or ore. The work of sinking a shaft even makes some operators impatient. Inside of two weeks the crosscutting already begun at the north end and more about to begin, should strike something; something by the way which will send the stock down to \$2 or up to \$200. On this information people

GEN. GRANT AS A MINING PRESIDENT.—The country has been informed that Gen. Grant was lately elected President of the San Pedro and Canyon del Agua Mining Co. in New Mexico. This company is reported to own 40,000 acres of land in that Territory, and this immense tract is said to comprise mines of gold, silver and copper. It is alleged further that many Eastern capitalists are largely concerned in the gigantic enterprise. The character of the enterprise is thus set forth by the New York Tribune, the facts having been learned from Col. Grafton, of Washington. The San Pedro and Canyon del Agua Mining Co. is an incorporation organized under the laws of the State of Connecticut, with the following officers: President, George William Ballou; Vice-President, R. M. Pulsifer; Secretary and Treasurer, D. H. Darling; Superintendent, M. G. Gillette. It has capital of \$10,000,000, in 400,000 shares. Its property is situated about 36 miles southeast of Santa Fe, in New Mexico, and about 12 miles south of the Atchison and Topeka railway, which is now complete and in operation to and beyond that point. The company grants contain 42,000 acres of land. "This property," said Colonel Grafton, "was brought to my attention during the late war. In last October I learned it was in the market, and I secured an option of it. I sent an engineer to examine it and to report on it, and after receiving the reports I presented the matter to Mr. Ballou of Boston, who at once determined to organize a company for the purchase of the property, provided the reports made by my engineers were confirmed by him. We were fortunate in securing the services of Col. Gillette to examine the property, and after receiving his report we visited it, and the purchase by Mr. Ballou was



VIEW IN MINERAL KING MINING DISTRICT.

Fowler. The Supt. is R. B. Harper, well-known in the mining circles of California and Nevada. Mr. Harper has kindly given your correspondent every facility to learn for your columns the present condition of the company's valuable works. I have had the pleasure to accompany him through the mill and mine and to obtain all the details desired. First it should be known that the location of the mill is about 7,500 ft. above sea-level, while the upper tunnel of the mine from which the ore is taken is about 2,500 ft. higher, according to the best data that can be obtained, while surrounding ridges and peaks of the wildest and most craggy nature vary from 10,000 to over 13,000 ft. in altitude. Most of the slopes from these summits to the flat where the town and mill are located are at angles of 45°. These facts alone will give some conception of the natural difficulties that have been overcome. When work was suspended last December, Prescott, Scott & Co. recommended a

Careful Inspection of the Mine

By well-known mining men of San Francisco. Such examination was made in March and April by A. C. Lockhardt and R. B. Harper. Their report was favorable, and from it the present work has been done. This work embraces repairs of buildings and tramway, addition of hoisting works in the cave of the mine, and change in mode of working the mill. Everything is now unquestionably in first-class order for regular operations in mine and mill, and the latter began work Wednesday, the 28th, with 150 tons of excellent looking ore in the ore-house.

Character of the Ore.

Your correspondent has carefully examined this ore. It is entirely different from any ore previously worked from this mine, and is unlike any ore yet shown from the ledges of this district. It is in an extremely decomposed condition, showing considerable oxide of iron. It is full of black sulphurets of silver. No galena or "black jack" perceptible in it. Mr.

\$10 to \$35 gold; Lady Franklin, cap ore, \$20 to \$60, tunnel in about 40 ft., and ore from it assayed about \$82 silver. The Lady Emma ledge, in Monarch canyon, and not shown on map, assays from \$4.50 to \$150.

Beyond Farewell gap, near the head waters of the Little Kern river, are several promising ledges, not named on the map. These include the Occident, the Lakeside, Flagstaff, Bank Smasher, Lost Treasure, Bullion, and Broder and Bequette. On the latter claim a shaft is down 16 ft., and a tunnel on the Bullion is in 20 ft. The assays on some of these ledges are reputed to be fair, though their exact figures cannot be obtained.

In All Over 200 Claims

Have already been located and recorded in this district, as I am informed by Mr. George Carrington, Recorder of the district.

The sharp, saw-tooth peak, seen in the distance through the canyon, is Miner's Peak.

The highest near here, and perhaps over 13,000 ft. high. The engraving is prepared from two photographs, and on such it is difficult to represent perspective correctly. Hence, Miner's Peak looks lower than adjoining ridges to right and left. In reality it towers far above them, and only looks lower because it is more distant. It is one of the highest peaks of the Sierras and is a noted landmark, as seen from the greater part of the plains in Tulare and Fresno counties. Your readers will learn more about this grand peak and its surroundings in future letters.

Mineral King, July 26th.

ADMIRAL AMMEN has addressed a letter to the President of the American Geographical Society, in which he says that the Nicaragua canal will follow the Lagos route, and only cost \$45,000,000.

NEW ZEALAND has now over 1,100 miles of railway, all built within about 12 years, and all narrow-gauge or three feet six inches.

can "short" or "long" as may best suit them. The man who has a choice is entitled to put up his money on it.

The talk about working low-grade ores seems about to be settled. Private individuals who are out of work simply go to the waste dumps, cart away the rock, and do the best they can with it after the fashion of primitive times. In many of the dumps they are liable to strike \$30 rock, which won't need much blasting either.

The Quinn mine continues to attract attention in a style that is making the insiders madder and madder every day. About a year ago a few men who held the stock considered they had indications which, if properly manipulated, would result in a little deal. They proposed to put it up not over \$3, which was then considered pretty good for Quinn. They made little progress, however, and, believing it would never do to put the stock up unless there was some merit, they let it go for anything. After that they struck it, and then attempted to get the stock in, and some partially succeeded, but hardly as well as they wished. Some insider is supposed to have "blabbed," and now they stand a chance of seeing the stock reach \$10, with "dead loads" of it held by outsiders, who are about as well posted as anybody on its value.

HAND DRILL.

THE MYSTERY EXPLAINED.—A patron of the Oakland water company, who has a fine residence in that city, informs us that he has entire faith that the noted Dr. Tanner will succeed in fasting 40 days and 40 nights without the least danger of dying for the want of nourishment if supplied with the very strong water furnished our neighboring city. If any person doubts our friend, a smell of the reservoir, or even the water from them, will be convincing. It is proper to add that the company's water also smells very bad of extortionate prices, seriously detrimental to the welfare and future growth of Oakland.

consummated, and a company organized. Copper, silver and gold were found upon it, and the mines were worked extensively in 1839 and 1842 by Mexicans, who carried their water for washing the gravel on the backs of donkeys. Hydraulic engineers have been employed by the company to bring water from the Sandia mountains to the placer mines. The work will be commenced about the 1st of October. A large smelting establishment for the reduction of the silver, will be erected and in operation by that time."

UNION CONSOLIDATED YIELD.—The north end of the Comstock is not yet absolutely barren. The annual statement of the Union Con., which was lately published, shows that during the past year, and up to June 30, 1880, the mine has produced 30,019 tons of ore, all of which has been milled, and has yielded the sum of \$1,174,803.45, or \$39.13 per ton, that being 81% of the assay value, no allowance being made for moisture. The value of the gold in the hullion was \$566,465.59, and of silver, \$608,337.86. This ore was all taken from the ore body lying on the northern boundary, which was first discovered in the Sierra Nevada incline, 19,781 tons being extracted from the 2300 level and 10,238 tons from the 2400 level.

HOPE FOR THE CASTAWAYS.—The lively interest felt in this city for the safety of the crew of the foundered ship *Mathilde*, who are supposed to be on the island of Socorro, lying off the Mexican coast, was intensified by the graceful act of an English gentleman. As soon as he learned of the probable fate of the castaways, Sir Thomas Hasketh dispatched his steam yacht, *Lancashire Witch*, to their rescue. The yacht sailed on Wednesday. At the same time the government sailing yacht *Freda*, was dispatched by special order of the Secretary of the Navy, on the same errand of mercy.

Entry of Public Lands.

Commissioner Williamson, of the General Land Office, has issued the following letter of explanation and construction of the scope and force of the act of Congress relating to the public lands of the United States:

To Registers and Receivers of the United States District Land Office:—I have to direct your attention to the provisions of an act of Congress, approved June 15, 1880, entitled "An act relating to public lands of the United States," of which a copy is appended. Section 1 provides that when any lands of the United States shall have been entered, and the Government price paid therefor, no action shall be had or further maintained for or on account of certain trespasses therein specified. The first proviso to this section restricts its application to trespasses of a date prior to March 1, 1879. This section extends to such trespassers the privilege of paying for lands upon which the specified offenses were so committed, at the price per acre for which, under the law in force at the date of payment, the lands could be sold.

This privilege of purchase is not confined to the lands subject to private entry, but extends to any lands, not mineral and subject to disposition, under the general existing laws. This section cannot be construed to permit a party who falls within the class of offenders named to enter land if the valid claim of another person shall have attached prior to his application to purchase and is still subsiding. Whenever an application shall be made to purchase under this section, you will require the same to be presented under the oath of the applicant, giving a full and detailed statement of all the facts upon which he bases his claim to purchase. Such sworn statement should be corroborated by the affidavits of credible witnesses, and you will thereupon forward the papers in a special letter to this office, allowing no entry until so directed by me. Under Sec. 2, duly qualified persons who, prior to June 15, 1880, entered, under any of the homestead laws, lands properly subject to such entry, are permitted to obtain title by paying the Government price, less the fee and commissions paid at the date of original entry. When homestead entries made prior to June 15, 1880, have been attempted to be transferred by a bona fide instrument in writing, persons to whom such transfers were made are likewise authorized to obtain title by like payments, and with like deductions of fees and commissions.

In allowing entries of the first-named class you will require proof that the party was 20 years of age, had declared his intention to become a citizen of the United States, and was in other respects entitled to make the entry. In permitting entries by transferees you will require the instrument in writing, by which it was sought to transfer such homestead right, to be filed together with the best evidence attainable of the bona fide character of the transfer, including the affidavit of the party who seeks to purchase. You will exercise all possible care in this matter, as it is not improbable that the proper execution of the law will largely depend upon your vigilance and discretion. In cases wherein you entertain a doubt of the propriety of allowing the application to purchase, you should refer all papers to this office with a full statement of facts and your opinion. Under the proviso for this section you are specially instructed to allow no entry which interferes with any entry of land under the homestead laws made subsequent to the original entry, on which the application is made to enter under Sec. 2, and if the land was embraced in the prior entry at the date of such homestead, the section is in operation, inasmuch as in that case the land was not properly subject to entry.

The application to purchase must likewise be rejected if, at the date of the original homestead entry, a prior claim, which has not been abandoned or forfeited, existed. Under any law, I do not construe this section as intended to permit the parties named as conditional purchasers to make an entry of tracts to which adverse legal rights have attached prior to the date of the act. The third section reduces to \$1.25 per acre the price of any lands, which were subject to ordinary private entry, at \$2.50 per acre at the date of approval of the act, having been doubled in price by reason of the grant of alternate sections for railroad purposes, and which were put in market at that price prior to January 1, 1881. Lands which have not been put in market for sale at ordinary private entry at \$2.50 per acre, or which were so put in the market subsequent to the 1st of January, 1881, are not changed in price by this section. You will carefully observe the rule as to price thus introduced. By reference to your official records it will be in your power to ascertain the facts with regard to any lands from which to decide as to its applicability to them. In case of doubt you may correct your records to exhibit the facts by correspondence with this office. You will further observe that under section 4 none of the provisions of this act apply to mineral lands, and that no person is entitled to the benefit of any provisions of the act who falls within the inhibition named in this section.

COMPRESSED AIR LOCOMOTIVE.—Lately a number of persons assembled at Woolwich Arsenal, England, for the purpose of witnessing tests of a compressed air engine invented and patented by Col. Beaumont, R. E. The engine

is merely an experimental one, though others of a better shape have already been made. The motive principle is compressed air, the difficulties in the application of which Col. Beaumont has, after some years of experiment, succeeded in overcoming, and has at last constructed an engine in which the entire power stored up in compressed air can be utilized, no matter how high the pressure may be. The engine is designed for use upon tramways, underground railways, or any line of rails on which smoke, steam and noise are objectionable. The air having first been compressed by a stationary engine, is stored in the reservoir under a pressure of 1,000 lbs. per square inch, whence it passes through three cylinders, and is finally noiselessly ejected into the atmosphere. After a brief explanation by Col. Beaumont, a carriage was attached to the engine, on which the company took seats, and several runs were made along the metals in the arsenal for a distance of about one-third of a mile. The result was that the mile was accomplished in something under five minutes, making allowances for frequent stoppages, owing to the rails being in use and the general roughness of the arrangements. This was done at a loss of only 200 lbs., the gauge showing 1,000 at starting and 800 after a run of four miles. But this is by no means a test of the capabilities of the engine, which has been so constructed as to attain a speed of 25 miles an hour, and to run for 22 miles with one charge of compressed air. This engine is perfectly noiseless, completely under control, and seems destined to very considerably modify, if not to supersede, some of the modes of traction now in general use.—*Colliery Guardian*.

SCIENTIFIC LUMBERING.—The rapid disappearance of our forests renders every effort at economizing in the production of lumber a matter of very considerable general interest. The progress made in this direction has been summed up by an Eastern contemporary as follows: Where 20, or even 10, years ago, half an inch of timber was turned into sawdust for each board cut from a log, the best modern practice gets along with a waste in this way of only one-quarter, and in many cases, with one-eighth of an inch. The mills that are not supplied with lath machinery, splatters, wood saws, etc., for the purpose of working up all this refuse and giving it a market value, are considered to be but meagerly equipped; and unless they have some special advantage in the way of cheap timber or cheap transportation, are soon distanced in the race by their less wasteful competitors. The economy of lumber production, however, does not all lie in securing the greatest amount of marketable stuff from the least timber. Logs are hurried along from the water to the pile of finished lumber, with a rapidity that the pioneer lumberman of the northwest would have thought impossible when they first planted a sawmill alongside of western waters. The progress made even in the past 10 years is something remarkable. It was a comparatively rare thing in 1870 to find a mill man who brought logs into the mill, sawed them up with circular and gang, edged and trimmed the lumber, and carried outside the mill almost entirely without the aid of human brawn.

INDEPENDENCE LAKE.—This delightful sheet of water, on the eastern slope of the Sierras, is unexcelled either in beauty or attraction, says the *Truckee Republican*. The lake is surrounded by high mountain peaks, some of them still covered by heavy bodies of snow. The inlets to the lake are now filled with little torrents of water just off the snow. We cannot conceive of a locality possessing more delightful views than are presented at Independence. But the chief attraction there is the fishing facilities. Elegant boats and fishing tackle free, and the lake is conceded to be the best fishing ground in the State. The forests surrounding are also said to be well supplied with game. Deer are just making their appearance, and are said to be quite plentiful.

A NEW PHASE OF DECORATIVE ART.—Some of the semi-scientific idlers at Nahant, says the *Springfield Republican*, have taken to cherishing families of decorated crabs. The plan is to treat the newly captured crab to a hard scouring with a nail brush until his shell is perfectly clean; when he is placed in a jar with a quantity of sea-weed. As soon the bewildered crab recovers his senses, he seizes a bit of weed, bites it off, covers it with some sticky substance from his mouth, and presses the end upon the shell on his back; and there it sticks and grows. The idea of the poor crustacea is to hide himself from the sharks and rays that like to make a dinner off of him, and he keeps up the process until he looks like a moss-covered rock.

VALENTINE LAND SCRIP.—Secretary Schurz has rendered an important decision respecting this notorious land scrip. A dispatch from Washington of the 19th inst. says that the Secretary has just sent in his decision confirming that of the Commissioner of the General Land Office, which denied the application of certain parties to locate Valentine scrip on land in San Francisco. In his decision Secretary Schurz holds that the questions proposed were settled adversely to the claimants in precisely similar cases in Chicago, and there is no ground for going over it again, inasmuch as neither the city of San Francisco, the State of California nor the United States demand a reconsideration of it.

THE SADDLE AGAINST THE BUGGY.—The memory of man extendeth to the day when the boys on the farm were proud to ride a fine young horse to church or to see the girls. His took pride in the colts and taught them to move freely under the saddle, and above all, when the colt was broken he was taught to walk. Now, the boys must have a fine buggy and harness, and the colt must show his style and speed all this time. The boy is in too great a hurry to allow the colt to walk. The colt, buggy and boy are soon a used-up set by fast driving. The whole business of buggy riding by farmers' boys is expensive, extravagant and demoralizing. Not one farmer in ten can afford such a turnout for the lad. Many of them buy a buggy and let it stand in the sun and storm. They are too poor to have a house for vehicles. Some men cannot afford the luxury of a buggy. If we could return to the fashion of riding on horseback we would save millions to the farmers, and the boys and girls would develop better forms and have better health. Any lazy lout can ride in a buggy, but to be a graceful rider on horseback one must have some energy and get up in his nature. There is life and health in riding on horseback. The whole system feels the invigorating effect of it. The rider and the horse catch the fire of sympathy and excitement in the run or fast paces, and every nerve and muscle of the body is brought into healthful invigorating play. This mania for trotting horses has been felt on every farm in the land. The country is full of road horses that some man or boy loves to pull the string on. They are usually poor saddlers, slow walkers, and rough. We need a reform. The place to begin is in breeding a class of horses of good size, style and action, that can move freely in more than one gait. The English market is open for such horses. The well-knit horse of good style and action, suitable for a hunter or a carriage, will bring better prices than our average horse. The farmer will find it to his interest to raise a class of colts that the boys will like to ride. He can raise three or four fine saddle-colts for what one buggy and harness will cost, and a fair saddle-horse will bring more than the average roadster.—*Nashville American*.

SANITARY INSPECTION IN PARIS.—The statement recently made by Edward Griffiths, C. E., says the *London Telegraph*, upon the frightfully insanitary state of many new and handsome London houses, may well alarm the public. A cheap and easy method of obtaining a report on the pipes and drains of the house, and of rectifying them if defective, should be within the reach of every proposing tenant. The plan pursued in Paris, which secures impartiality in the inspectors, and which was noticed by one of the speakers at the recent conference, might, with advantage, be transferred to London. The inspector is taken from a different part of the city to that where he is to make a report. He is sent to a house and told to examine its sanitary condition, without any information being supplied to him as to who is setting him in motion, whether the landlord, the tenant or his official superior, and he knows not whether he may not be sent to test his own efficiency or to confirm a previous report by some colleague. By these means collusion between inspector and builder, or inspector and landlord, is at all events rendered improbable.

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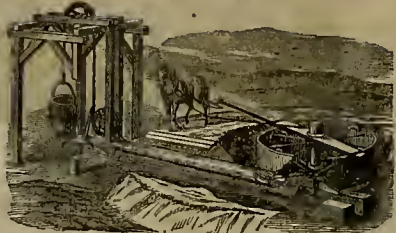
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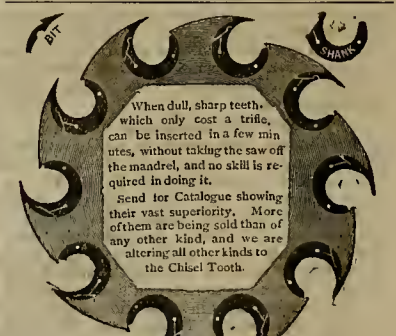
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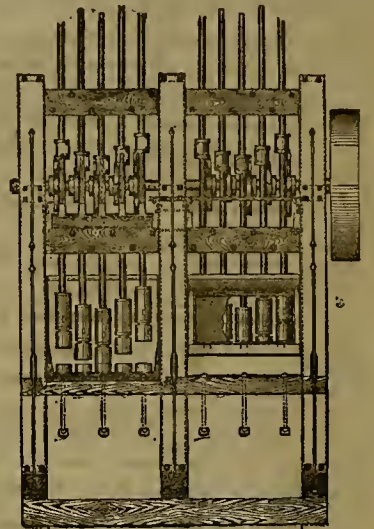
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Wall Street, New York.**Machinery.****GOLD AND SILVER****Grinding and Amalgamating
MACHINERY.**Stamp Mills, Rock Breakers, Crushing Rolls, Amalgama-
ting Pans and Separators for Gold and Silver Ores, Chloro-
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Shoes and Dies for Stamps, and every description of Mine
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Wrought-Iron Frame
FOR STAMP MILLS.**Great saving in time and money over the wood frame. Is
made complete with wrought-iron frame ready to put upon
the foundation, requiring no skilled millwright. These mills
are unsurpassed in excellence in every particular.We are furnishing all the Machinery for a 10-Stamp Gold
Mill, including Crucible, Steel Shoes and Dies, Boiler and
Engine, Counter Shafting, Pulleys, etc., Stamps weighing
450 lbs. each, with Copper Plate inside of the Mortars, and
for tables outside, making all the Machinery complete for a
10-Stamp Mill for the sum of**\$2,550.**We construct Mills with Stamps weighing from 350 to 900
lbs. for gold or silver Ores. Wet or dry Crushing Mortars.
Will contract to erect complete Gold and Silver Mills on the
most improved plans. We have 30 years' experience in min-
ing and milling Gold and Silver Ores, and can compete with
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DRILLS, with or without power, at short notice, and
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Books for Miners and Millmen.KUSTEL'S CONCENTRATION OF ORES (of all kinds), includ-
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arsenures, and gold and silver ores generally, with 120 Heli-
ographic diagrams. 1877. This work is unequalled by any
other published embracing the subjects treated. Post-paid,
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trated, 114 pages. 1876. A useful and practical work, free
from technicalities and extremely serviceable for miners, etc.
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Pocket size, and very handy and convenient for miners.
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KUSTEL'S ROASTING OF GOLD AND SILVER ORES (Second
Edition) and the Extraction of their Respective Metals
without Quicksilver. Illustrated. 166 pages. 1880. A val-
uable and carefully written work. Postpaid, \$3.00. Sold by
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Connection in every town in the State for collection of
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chanical Movements, illustrated and described. Inventors,
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Copp's Hand-Book of Mining Laws.Henry N. Copp's hand-book of mining laws, just issued,
contains the United States mining laws and instructions
thereunder, a digest of decisions, forms, list of mining
patents issued, etc. The digest of decisions alone is a
very valuable thing, giving, as it does, in brief form, all
the decisions of the Secretary of the Interior and Com-
missioner of the General Land Office in relation to mining
matters. These are all under proper headings for easy
reference. Forms are given for notice of location, proof
of labor, notice of forfeiture, miners' lien, application for
survey, patent, etc., affidavit of improvements, etc.
There is also a list of patents issued for mining claims
from July 26th, 1866, to August 1st, 1877. The book is
of pocket size and very convenient for all who are inter-
ested in mines. It will be sent post-paid for \$1, on ap-
plication to Dewey & Co., 202 Sansome street, San Francisco**A Card from Architects.****The California Architect and
Building Review.**

Office, No. 240 Montgomery Street, San Francisco, Cal.

It is with pleasure that we publish the following from
prominent Architects in this city.Believing that a journal of this kind is a necessity on this
coast, and judging from what has appeared in the "Quarterly
Architectural Review," we are led to believe that the
CALIFORNIA ARCHITECT AND BUILDING REVIEW
will be worthy of generous support and encouragement. We
therefore pledge our cordial sympathies, personally, and hope
that the enterprise will receive kindly recognition and liberal
support from all Architects and Builders and the public gen-
erally. (Signed) David Farquharson, Wright & Sanders, S.
H. Williams, Thos. J. Welsh, P. Huerna, John Marquis, B.
McDougal & Son, Wm. Mosser, Wm. Curlett, Meeker &
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For particulars apply to JOHN CAINE, Proprietor.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING JULY 20TH, 1880.

- 230,225.—TANNING LEATHER.—S. Bloom, S. F.
230,117.—CHAIR-BRACE.—R. J. Farum, Oakland, Cal.
230,131.—SUOAR MACHINE.—W. Jasper and S. Boushey, S. F.
230,319.—CAMERA ATTACHMENT.—R. J. Molera and J. C. Cebrían, S. F.
230,320.—MICROSCOPE.—E. J. Molera and J. C. Cebrían, S. F.
230,321.—ELECTRIC SWITCH.—E. J. Molera and J. C. Cebrían, S. F.
230,322.—OPTICAL INSTRUMENT.—E. J. Molera and J. C. Cebrían, S. F.
230,323.—BOILER AND CONDENSER FOR VAPOR ENGINES.—E. J. Molera and J. C. Cebrían, S. F.
230,324.—PHOTOGRAPHIC APPARATUS FOR REDUCING TO A MICROSCOPIC SCALE.—E. J. Molera and J. C. Cebrían, S. F.
230,325.—DREDGING MACHINE.—J. A. Murray, Stockton, Cal.
230,102.—PLOW.—H. A. Olmsted, Oakland, Cal.
230,209.—WINDMILL.—J. H. Thierin, Oakland, Cal.
230,169.—PHOTOGRAPHIC.—J. A. Todd, Sacramento, Cal.
230,167.—PROPELLING SHIPS.—F. Von Leicht, S. F.
2,312.—LABEL.—A. W. Stone, San Quentin, Cal.

List of Canadian Patents issued to Pacific Coast Inventors:

- 11,193.—BLASTING POWDER.—J. Pattison, Nevada, Cal., April 24, 1880.
11,274.—PILLOW SHAM FRAME.—J. B. Adams, Oakland, Cal., May 26, 1880.
11,319.—HARROW.—N. Valley, Jr., S. F., June 5, 1880.
11,331.—AXLE.—E. A. Wible, Folsom, Cal., June 5, 1880.
11,374.—NEWSPAPER HOLDERS.—W. C. Fitch and C. Day, Sacramento, Cal., June 14, 1880.
11,404.—ART ALBUM.—E. S. Glover, Portland, Ogn., June 19, 1880.
11,409.—Piston Packing.—Oso. C. Phillips, Silver City, Nev., June 19, 1880.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

BERRY BASKET.—Roswell E. Morey, S. F. Patented July 13, 1880. No. 229,904. This invention relates to that class of berry baskets made of bent veneers, and provided with a sheet-metal rim crimped over the edge. Heretofore the sheet-metal rims have simply been bent at the corners, and experience shows that when the baskets are of the larger sizes need the bends at the corners of the sheet-metal strip are too weak to retain the basket in its proper form, and in handling it changes form. The object of this invention is to overcome this difficulty, and it consists in casing within the sheet-metal rim, at its corners, a brace or strengthening plug of solder, or other metal or alloy, which makes the corners solid, and greatly strengthens the strip and enhances its capacity for preventing the top or rim of the basket or box from changing form.

WINDMILL.—Joseph H. Therian, of Orland, Colusa county, Cal. Patented July 20, 1880. No. 230,209. This device consists of a novel exterior rim for the wheel to which the vanes are hinged, this rim being made in zigzag sections, and having the arms or spokes of the wheel extending from the hub to the angles of these sections, so that they stand alternately forward and backward from a plane, and thus brace the rim. It also consists in a novel formation of the vanes, which are curved similar to a plowshare, and are hinged to this angular rim, so as to stand diagonally with the plane of the wheel, and they may be adjusted to the strength of the wind by means of arms connected with a ring or sleeve sliding upon the shaft. It further consists of a peculiar socket by which the mill may be mounted upon a single post, this socket having a vertical spindle upon which the wheel, axle and upper part of the mill may be mounted to swivel about as the wind may make it necessary.

GANG-PLOW.—Henry A. Olmster, Oakland, Cal. Patented July 20, 1880. No. 230,192. This invention consists in a means of adjusting the cut of the plows and holding them down. Ordinarily, in gang-plows with rigid beams, when they are lifted out of the ground the heels of the plows are apt to drag on the ground. This cannot occur in the present device, since the raising of the loose plow-beams elevates the points of the plows, and the elevation of guides lifts the rear ends. Each of the plows hangs loose and independent, and while they are lifted together, held down together, and have their depth of cut simultaneously regulated, each has an independent motion as well, so that one can go over a mound or ridge and not affect the other. The adjustment of the plows is all regulated from the driver's seat.

SHEEP-SHEARS.—John G. Corey, Santa Paula, Ventura Co., Cal. Patented July 13, 1880. No. 229,872. This device consists in a novel means for adjusting the tension of the spring, so that any pair of shears may be adjusted from the lightest to the heaviest tension, to suit the hand of the operator, and to regulate them so as to be used in light, heavy, or dirty wool.

THE MECHANICS' FAIR.

New and Interesting Features.—Prospects of Unusual Success.

OPENS AUGUST 10th, 1880.

The Fifteenth Industrial Exhibition of the Mechanics' Institute of San Francisco will open with all the usual formalities, on Tuesday, August 10, 1880. The Managers of the Institute have put forth extra exertions to make this year's exhibition of superior usefulness and interest—and a fitting exponent of the character of our fields, our workshops and of our social and æsthetic life. Circulars have been issued clearly and fully announcing the purposes and expectations of the management, and calling upon all the varied industrial interests of the State, and of the entire Pacific coast, to come forward and make the exhibition of this year one which shall excel all that have preceded it.

It is confidently expected that the liberal offer of premiums of gold, silver and bronze, and diplomas, and cash will present an additional inducement for exhibitors to come forward and put forth their best efforts to secure such a combination of attractions as cannot fail to call out an unusually large number of visitors from both city and country.

One of the leading features of the fair will be

The Horticultural Display.

To effect this, an arrangement has been made with the California State Horticultural Society, to take special charge of this interesting department and make it an exhibition which shall be worthy of our State, and a proper representative of its grand horticultural interests. This portion of the exhibit will be wholly under the charge of the Horticultural Society, and the appointment of Judges will be made with reference to their special fitness for the examination of the exhibits entrusted to them. The premiums will be awarded by the Institute solely upon the recommendation of such committees as the society shall appoint. All persons engaged in horticulture, whether as professional or amateur, are invited to do what they can towards making the exhibit comprehensive and representative.

Horticultural Premium List.

PLANTS, TREES AND FLOWERS.

- To the exhibitor making the best and most attractive continuous display of plants and flowers during the exhibition..... Silver medal and \$75
Second do..... Bronze medal and 50
To the exhibitor making the best display of foliage, plants and ferns..... Silver medal and 50
Second do..... Bronze medal and 25
Best group of hardy palms and araucarias..... Bronze medal and 25
Best group of orange or lemon trees, rarely, bright and growth considered (not less than 10 specimens)..... Silver medal and 25
Best display of tuberoses in bloom in pots (not less than 25 plants)..... Bronze medal and 15
Best continuous display of cut flowers during the exhibition..... Silver medal and 35
Second do..... Bronze medal and 20
Best continuous display of gladioli (not less than 40 glasses)..... Bronze medal and 25
Second do..... Diploma and 10
Best display and variety of dahlias..... Bronze medal and 25
Second do..... Diploma and 10
Best display of ornamental grasses..... Bronze medal and 15
Best display of rustic work and filling..... Silver medal and 30
Best single specimen of rustic work and filling..... Diploma and 10

OPEN TO AMATEURS ONLY.

Best 12 house plants, \$10; Best display of cut roses, \$10; Best specimen of climber on globe or trellis, \$5; Best collection cut flowers, \$10; Best carnations, \$5; Best 12 variegated-leaf geraniums, \$10.

FRUIT—OPEN TO GROWERS ONLY.

N. B.—No premium will be awarded unless the fruit is properly named.

Best collection apples, \$20; Best 12 varieties apples, \$10; Best collection pears, \$20; Best 12 varieties pears, \$10; Best collection peaches, \$20; Best 6 varieties peaches, \$10; Best 6 varieties canning peaches, \$10; Best collection plums, \$10; Second do, \$5; Best collection prunes, \$10; Best collection nectarines, \$5; Best collection quinces, \$5; Best collection figs, \$10; Best collection oranges, \$15; Best collection lemons, \$10; Best collection limes, \$5; Best display of grapes, \$25; Best collection table grapes, \$15; Best 6 varieties table grapes, \$10; Best collection wine grapes, \$20; Best 6 varieties wine grapes, \$10; Best collection raisin grapes, \$15; Best collection seedless raisin grapes, \$15; Best display Japan persimmons, \$10; Best display pomegranates, \$5; Best display blackberries, \$5; Best display raspberries, \$5; Best display strawberries, \$5.

DRIED FRUIT.

Apricots, best 10 lbs, \$5; Apples, best 10 lbs, \$5; Prunes, best 10 lbs, \$5; Peaches, best 10 lbs, \$5; Plums, best 10 lbs, \$5.

\$5; Pears, best 10 lbs, \$5; Figs, best 10 lbs, \$5; Raisins, Cal., best box of 20 lbs. or more, \$25; Seedless raisins, Cal., best box of 20 lbs. or more, \$15.

NUTS—CALIFORNIA GROWN.

Almonds, best 10 lbs, \$5; Walnuts, best 10 lbs, \$5; Chestnuts, best 10 lbs, \$5.

The officers of the California State Horticultural Society are as follows: Board of Directors—E. W. Hilgard (President), W. B. West, J. Strentzel, John Rock, C. H. Shinn, E. J. Wickson (Secretary).

All intending exhibitors are requested to announce at once what exhibits they expect to make, to the Secretary, E. J. Wickson, 414 Clay street, San Francisco.

The State Viticultural Society.

Established by the last Legislature, is also to have a special department to itself, immediately adjoining the horticultural exhibit. The rules governing this exhibit are to be left to the exhibitors themselves. There will also be a trial-room set apart and furnished, where, on special days, the wines exhibited may be tried by experts. A complete and comprehensive report will be made of each exhibit, and printed in full in the regular proceedings of the Institute. This, alone, will more than pay the exhibitor for all his trouble. It is to be hoped that all producers of the expressed products of the vineyards of California will take pride in sending the best they have, that a large and fine display may be made. Especially is this desirable at the present time, in view of the large number of European and Eastern visitors who expect to examine our products. The officers and members of this Board are as follows:

Arpad Haraszty (President); Charles A. Watmors (Vice-President); Chas. Krug (Treasurer); J. DeBarth Shorb, Isaac DeTurk, R. B. Blowers, Geo. West, Stockton, L. J. Rose, G. G. Blanchard. Dr. John I. Bleasdale, Secretary.

Manufactures and Inventions.

In addition to the productions of the soil and vineyard, there will be a grand gathering of the results of the manufacturing skill of our artisans. Inventors will also be there with their novelties in every line of mechanism. It is most certain that the

Display of Mining Machinery

Will be the most complete and extensive which has been seen in this city for the last 10 years—the whole presenting a complete embodiment of the brain work and inventive and mechanical skill of the Pacific coast. The officers and managers of the exhibition are: P. B. Cornwall, President; A. W. Starbird, Vice-President; J. A. Bauer, Treasurer; J. H. Culver, Secretary, and J. H. Gilman, Superintendent. The Board of Managers is composed of the following gentlemen: A. L. Fish, C. Waterhouse, James Drury, Nathaniel Hunter, F. A. Frank, David Kerr, Samuel Dinmore, J. R. Wilcox, Geo. H. Hopps, Edwin Fretwell and George Spaulding.

The pavilion will be brilliantly lighted with electricity and gas, forming a lively magnificent scene in the evening.

Applications for Space

Should be made at once to J. H. Culver, Sec'y, 27 Post street, San Francisco. The pavilion is now open for the reception of goods. The exhibition opens August 10th and all articles for competition must be in place not later than Friday, August 13th. Space allotted and not occupied by August 7th may be given to others. No charge to exhibitors for space, steam or water.

Goods for exhibition should be addressed, Mechanics' Fair, San Francisco.

Exhibitors should take great care to have their goods properly in place in the Pavilion at an early day. No articles will be received for competition later than August 13th.

Rates of Admission.

Double Season Tickets.....\$5.00
Single Season Tickets.....3.00
Children's Season Tickets.....1.50
Apprentice's Season Tickets.....1.50
Single Admission, Adults......50
Single Admission, Children......25

Award of Medals.

In addition to 62 cash premiums, varying in amounts from \$5 to \$75, the Institute offers 40 gold medals, 313 silver medals, 215 bronze medals and 92 diplomas. The full premium list will be given next week; or it may be had at any time on application to J. H. Culver, Sec'y, 27 Post street.

IMPORTANT TO VISITORS.

To visitors this exhibition will offer a combination of attractions, such as has never before been presented to the public of California, and far more than sufficient to repay them for their outlay. This display of the natural productions alone of this coast will be more in value to them than the cost of a season ticket. The Pavilion, during this exhibition, will not only be pleasing to the eyes and a pleasant place of resort and social reunion, but it may also be made a most important educational medium, and such a one as no one who desires to store his mind with useful information can afford to neglect.

GOLD MINING IN ILLINOIS.—Again the report comes from Chicago that placer gold mines have been discovered and are profitably worked in Logan Co., Illinois. The *Journal* says there seems to be no doubt of the fact that particles of gold—veritable, genuine gold—have for some years been picked up from the bed of a stream which runs through a series of broken and barren hills in that locality; but it is still a question whether the find is of sufficient importance to justify great expectations.

THE CLAYTON AIR COMPRESSOR.—We notice that the Hudson River Tunnel Co. have made a contract with Mr. Clayton, of Brooklyn, N. Y., for furnishing whatever additional air compressors may be needed in the future prosecution of important work. By a circular before us from the Chief Engineer of the Tunnel Co., we learn that the Clayton compressor is doing its work admirably well.

PITTSBURG contains 40% of the entire glass industry of the country.

News in Brief.

THE Chinese have named their war vessels after the letters of the Greek alphabet.

A good many Scotch and English, with money enough, are settling in Manitoba.

NEARLY all the tramps have disappeared from along the line of the overland railroad.

MEISSONIER declined the proposition made him to paint panoramas for an American showman.

At the Swiss Universities this year the female students have carried off most of the prizes.

GREECE has a little navy, comprising two iron-clads, manned by 384 sailors and commanded by 269 officers.

A HARTFORD man, while talking through a telephone during a thunder-shower, was knocked down by electricity.

A FIRE broke out at 12 o'clock, July 23d, which destroyed the entire business portion of Gibsonsville, Sierra county.

A CONTEMPORARY estimates the number of persons who are said to have lived for 40 days and 40 nights without food at 10,000.

THE Yellowstone *Journal*, Montana, says a St. Paul trader has brought there this season 2½ tons of beaver skins and other pelts in proportion.

THE Navy Department received dispatches from Admiral Wyman, which exonerates the Spanish steamer *Canto* for firing upon American vessels.

SINCE the water has receded in the Yuba river opposite Marysville, immense sand bars afford an indication of the debris deposited the past season.

A CENSUS enumerator says that this averages Plymouth county, Mass., farm, worked by a man and family, will not produce more than \$300 a year.

Two oil wells are being bored at Santa Cruz, and six more are being got ready for drill. The cost of boring, etc., for each well is from \$3,000 to \$4,000.

THE Supervisors of Yolo county have appointed a veterinary surgeon to examine the horses in this county and report all cases of glanders found.

A BUCK was recently shot some 10 miles from Red Bluff, on whose head are three antlers, having a number of prongs, making a perfect network of horns.

THE Philadelphia school of design for women has purchased the Forrest mansion, and this is said to supply the trustees of the Forrest home with needed funds.

THE trade between England and Greece consists of exchanging cotton goods for dried currants. The sum of these exports has scarcely changed in 10 years.

COLONEL VALLE of the Mexican army has taken the field against Victorio. He has permission from Washington to cross the Rio Grande if necessary.

AN Indians farmer says that labor has not been so scarce and high-priced in 65 years, and instances the employment of two women in his harvest fields at \$2 a day as proof.

A MANUFACTURER of Scotch caps and felt hats in Scotland has bought a factory in Vineland, N. J., to which he will remove all his machinery and hands this fall, bag and baggage.

THE steamer *Mamie*, having on board a party of excursionists, mostly altar boys at Trinity church, Detroit, was run down by the steamer *Garland* on the Detroit river, July 22d.

A M. NORCROSS, of Norwich, has set two hens, each with 12 eggs, dedicated one to Hancock and one to Garfield, and the most successful hen will determine how he will vote.

A NEBRASKA Sunday-school boy, on a picnic, leaned out of a car window and fired off a revolver. The ball killed a little girl who had just put her head out of another window.

So great was the vulgar curiosity to see the negro murderer Price hanged in Cincinnati, that white women, in order to gain admission, declared themselves negroes, and related to the criminal.

A KANSAS paper tells of a wild woman living along the Moccasin river. Her tracks have been found in the sand along the shore. Sometimes she wears shoes, and other times she goes in her bare feet.

IN the English fashion papers all the women depicted look cross and sour, while in our papers all the ladies are too lovely for anything, and look as though butter would not melt in their mouths.

PAINTING on kid is a favorite pastime with Parisian ladies, and bracelets, chatelains bags and belts of silk and white kid, painted with flowers and classic heads and mounted with gold and silver, are very popular.

A RECORD OF SCIENTIFIC PROGRESS.—We have received from the publisher the first number of *Science*, a weekly record of scientific progress. It is a well-printed quarto of 12 pages, enclosed in a cover. The editor is Mr. John Michels, and it is published at 229 Broadway, N. Y. *Science* counts among its list of expected contributors some of our most distinguished scientific writers and experts. The opening number contains several valuable papers, among the list being a brief monograph on the United States Naval Observatory, by Prof. Holden; "Electricity as Power," by Francis P. Upton; and "Errors of Refraction in the Eyes of Microscopists," by Dr. J. C. Morgan. There is besides a number of instructive paragraphs of scientific miscellany. It promises to be an attractive record.

The Mechanics' Fair Daily.



FAIR OPENS AUGUST 10, 1880.

By authority of the BOARD OF MANAGERS OF THE MECHANICS' INSTITUTE FAIR the publishers of the MINING AND SCIENTIFIC PRESS will issue a large edition of the ELEVENTH VOLUME of the MECHANICS' FAIR DAILY during the FIFTEENTH INDUSTRIAL EXHIBITION, which opens in San Francisco, Tuesday, August 10th, 1880.

It will be of good size, printed and circulated FREE in the Pavilion, and contain the day and evening programme, a list of exhibits, and official bulletin of the Institute.

Its columns will embrace a large variety of important industrial and scientific information, illustrations and well written descriptions of the general features and most deserving and novel exhibits in the Fair, a record of the Fair and incidents of its daily progress—gay, serious and comic—as they occur.

The best of editorial, reportorial and corresponding talent will be employed, with a view to make the paper of live interest in all its departments and of standard value as a full record of the great exhibition, the wonderful inventions, rich resources and rapid progress of our great Western Community.

More than ONE HUNDRED THOUSAND different individuals will read copies of our paper during the Fair. The novel character of the journal—the specially attractive features of its free issue in the Pavilion, and its absorbing interest to visitors at the Fair, the attention its column command when brought into the shop and family circle by those who receive it freely at the Fair, make the paper a powerful advertising medium.

The Managers have granted us the exclusive advertising and printing privileges, and will receive no advertising in the official catalogue and reports.

Our ten previous volumes have met with unrivaled success and gratifying results to advertisers, nearly all of whom were leading and first-class business firms.

Many thousands of marked copies were sent by mail and otherwise to friends near and distant, giving the FAIR DAILY a mere broadcast and universal circulation than any other newspaper published.

Its columns are more closely examined throughout than those of any ordinary publication.

By past experience, ample facilities, and a fair reputation of doing business in our line, we expect, with the reasonable support of all naturally interested in the success of our enterprise, to make the coming volume superior to its predecessors, and eminently satisfactory to the Institute, to our patrons and to the general public, who are more or less benefited by such an advocate of the substantial advancement of the grand and worthy industries of our coast.

Advertising Rates.

Per square (1 inch)	1 day	2 days	3 days	per week.
	\$0.50	.90	1.00	2.00

DEWEY & CO., Publishers.

Also, publishers of the MINING AND SCIENTIFIC PRESS, No. 202 Sansome street, N. E. corner Pine, San Francisco.

PERFECT METALLURGICAL WORKS.—There can be no doubt that the metallurgical works of San Francisco are absolutely perfect, both in their apparatus and the theoretical and practical skill of their managers. There are several snob establishments in the city, but as an example we will take the star works of Kustel & Riotte. It is simply perfect in equipment, and unrivalled in its large and skillful treatment of every variety of ore. There are rock-breaker, stamp mill, muffle, smelting, cupelling and roasting furnaces, amalgamating and grinding pans and barrels, and means for chlorination and lixiviation, and every approved process for treating gold and silver ores. There is a complete analytical laboratory, and a series of perfectly adjusted scales. And all these tools and means are in the hands of men who are both scientific and full of experience. Mr. Kustel is a veteran mining engineer and metallurgist; while Mr. Riotte seems to be a born mining engineer and metallurgist, whose disciplined and active mind, marvelously deft hands and amazing capacity for work are equal to every demand of the mine, the mill or the laboratory. These gentlemen have associated with Mr. H. Mathey, a mining engineer of varied experience on this coast, and opened a branch of their famous metallurgical works in New York City. The new firm will be an immense acquisition to the mining interests of that city. The character and value of their ores may now be determined by working tests of the ton or fractional parts, instead of the usual and unsatisfactory half ounce, or the costly operation of the 20-stamp mill. We feel assured that their work, in whatever department it may be, will be appreciated in their new field.

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DIVIDEND NOTICE.

OFFICE OF THE

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Nevada Block, Room 37, S. F., July 15, 1880.

At a meeting of the Board of Directors of the above named Company held this day, Dividend (No. 56) of Fifty cents (50c.) per share was declared, payable on TUESDAY, July 20, 1880. Transfer books closed until Wednesday, 21st.

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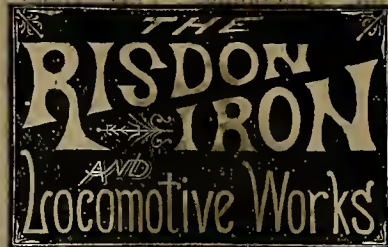
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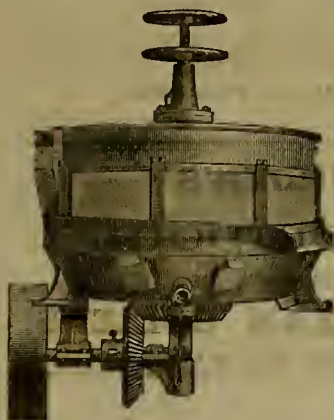
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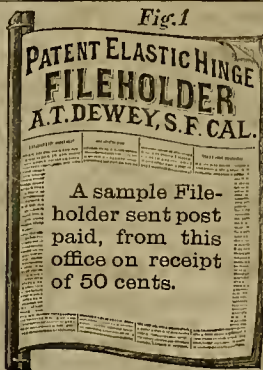
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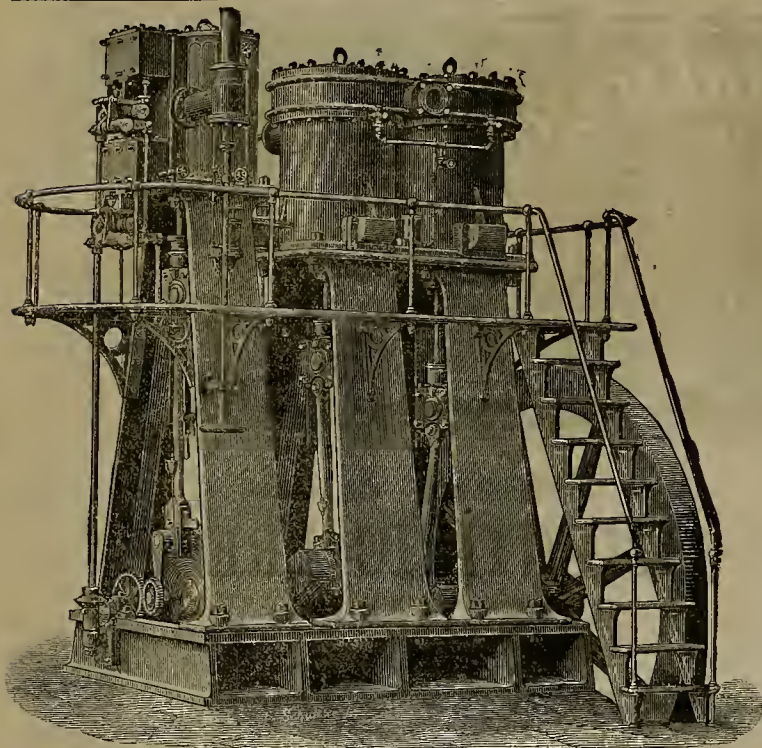
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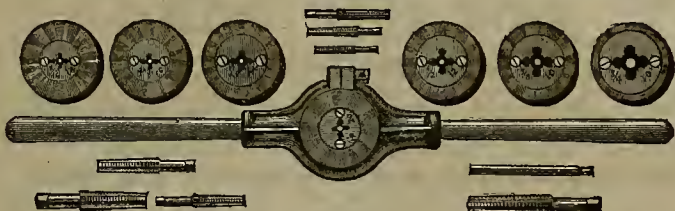
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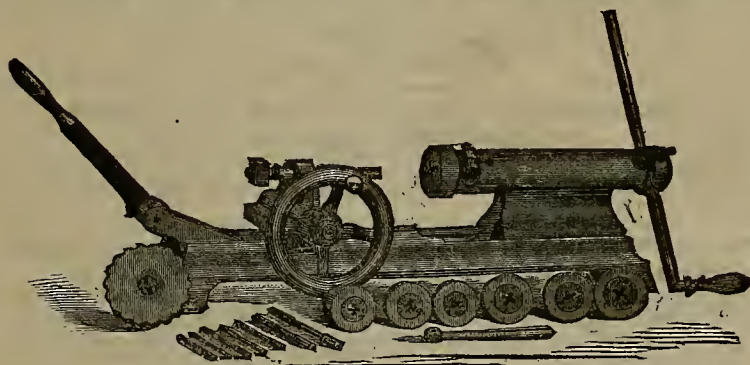
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, AUGUST 7, 1880.

VOLUME XLII
Number 6.

How Miners Work in America.

Under this heading the *West Briton* publishes, and other British papers copy, an account of the extraordinary hardships of a miner's life in the United States, as illustrated in the experience of a Cornish miner. At a meeting held recently at West Seton, Mr. John Rule had this to say respecting the kind of a life he led while working as a miner in the State of Nevada. We quote his words as they are printed:

"Some years ago I went to Nevada, and if any fellow wants to know what hard work is, there is the place to go. It is true we earned capital wages of \$4 (16s.) a day, equal to £24 16s. per man per month, but to do so we had to work under so many slave-drivers, and to work like slaves. We had to work 10 long hours every day, and Sundays and Mondays all alike, for there is no Sabbath there kept holy—we had to work on Sundays the same as on week days. All sorts of hardships and privations had to be endured, and the great want of water is one of the greatest. All our allowance of water for everything was one pint per day—drinking, washing, cooking, etc.—no more to be had. You, in Cornwall, who have such an abundant supply of pure water, cannot understand what we had to put up with for the want of a sufficient supply. If you cease working for a moment, the 'bosses' (overseers, captains, or slave-drivers) sing out in a way not to be misunderstood, 'Keep that hammer going.' Of course \$4 or 16s. a day are very high wages, but let me tell you that if a man is getting fair wages at home he had better remain at home, for it almost amounts to selling your life for a few dollars to endure what I did there. There are no humanizing influences in such places—wretched cooking, great exposure, hardships innumerable. I believe, upon my soul, that if men were to work in Cornwall as hard as they work abroad, and he paid at the same rate they are paid at present, they would earn £7 or £8 per man per month. In Nevada it costs to live from £6 to £7 a month, everything there being exceedingly dear. The scarcity of water can be well understood when I tell you that during the whole time I was in Nevada—seven years—we had only rain three times that would sink into the ground as deep as your ankle. If you do not like your work, you can leave it. You can be discharged at an hour's notice, and there are plenty of hands there to take your place."

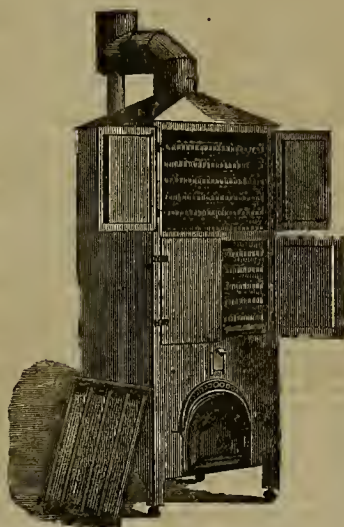
Mr. Rule's statement will be refreshing news to the large body of miners employed in the various mining camps of Nevada, a large percentage of which is composed of British and Irish miners. And it is safe to assert that the major part of the British miners, at least, came to this country by the advice of friends already here, or that they were allured hither by the large pay and the general good treatment that miners received. Mining, under similar conditions, is alike the world over; and if a difference for the better exists anywhere, it is certainly in the United States. Else why have so many Cornish miners congregated in our mining camps, especially in those of Nevada? It was simply because of the large wages, the relatively easy work, and the fair treatment. We do not believe that any capable or faithful miner, who did his work as well behind the foreman's back as under his eye, would for a moment think of his boss as a 'slave-driver,' or of himself as a 'slave.' If these terms are ever used by miners anywhere on the Pacific coast, it must be among that class that habitually shirks work, and impels the foreman to 'sing out, 'keep that hammer going.' Mr. Rule's experience was peculiar to himself. It is not, and never has been the practice. The absurdity of the charge is shown at once by the rate of wages paid to miners—the substantial sum of \$4 per day. That wage implies either a demand for miners, or the existence of a miner's union, at once powerful enough to fix and maintain a rate of wages, to determine the length of the working shift, and to compel fair and decent treatment. The terms, 'slaves' and 'slave-drivers,' are wholly incongruous with the wage of \$4 a day.

The water famine which existed in Mr. Rule's Nevada camp, where the allowance for everything, drinking, washing, cooking, and even *cetera*, was one pint per day, is perhaps the most

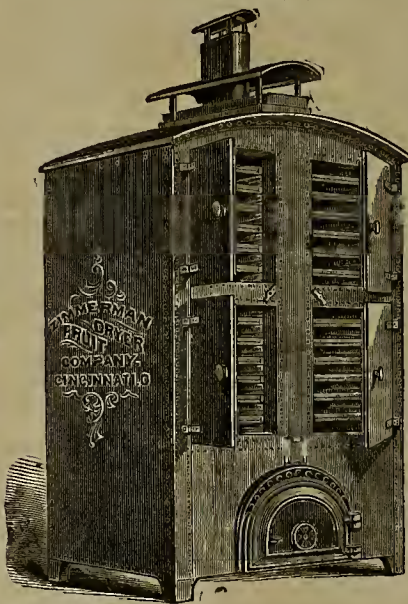
comic feature in his marvelous experience. "During the whole time I was in Nevada, seven years, we had only rain three times that would sink into the ground as deep as your ankle." It is to be hoped that heer was abundant in that phenomenally dry camp. It would have been to the purpose if Mr. Rule had, while making his statement of his mining hardships in Nevada, specified the camp and the region where those horrors existed. It was not on the Comstock—where during the last several years the men have had to contend with the hardship of excessively hot mines, but only for short intervals—for there cool water and ice are supplied without stint. Nor does the condition of any mining camp in Nevada now or heretofore fit the statement of Mr. Rule. And we are forced to regard it as a harmless and extremely dry joke.

The complaint of the want of "humanizing influences," of "no sabbath day kept holy," is the merest puerility. Mines are not found in well-established cities, where the church, and the school-house, and the family and society exist, but in remote, wild, mountain regions. When men go to those regions they carry the

SIZE NO. 2.



SIZE NO. 3.



THE ZIMMERMAN FRUIT AND VEGETABLE DRIERS

good and bad that is in them, and they form the best communities possible under the conditions. As a reasonable man, what else could the Cornish miner expect in the wilds of Nevada, or Australia, or Mexico, or South America? The fact is, that for years the condition of our mining camps has been, under the circumstances, simply admirable. The license which, inevitably attends the wild rush to a new camp soon subsides, and is followed by a degree of order and respect for law which is remarkable. Discomforts there are of course; but on the whole, the fare and the wages and the means of happiness, to say nothing of the opportunities, of the miners on the Pacific coast are, we are justified in asserting, vastly superior to that of a similar class in any part of the world.

SOCORRO ISLAND.—It is stated on the authority of Capt. Delion, of Port Townsend, W. T., who is represented to be well informed respecting the condition of Socorro island, that there was a plenty of water, sea turtles and water cresses on the island when he visited it. It is his judgment that Capt. Jones of the foundered ship *Mathilde* and his party reached Socorro island safely, and after recruiting they probably sailed for the mainland.

OREGON DISCOVERIES.—There are reports prevalent that highly important discoveries of placers and quartz veins have been made in Yamhill Co., Or.; the former in Moore's valley, and the latter on the north fork of the Yamhill river, near Daniel's mills.

RICH MINES IN IDAHO.—The Crown Point and Wolverine mines of the Elmira Co., at Banner, Boise Co., Idaho, constitute a remarkable property. We learn from the *Herald* that in both mines, which adjoin on a common vein, there have been lately developments of a very rich ore body. On the surface the vein varied from 1 to 2 ft. in width, but it gradually increased in size until at the depth of 200 ft. it had expanded to 9 ft. While the vein had increased so enormously in size, the quality of the ore had also greatly improved, and a rich black sulphuret (probably brittle silver ore) largely predominates. Notwithstanding the size of the great vein at the depth of 200 ft. it appears that the maximum width has not yet been reached, for in sinking the shaft only 10 ft. deeper the vein was discovered to be 14 ft. wide, and both walls diverging. It is stated that 1,000 tons of ore taken out of the mine last year produced bullion valued at \$100,000; and further that there is little or no waste rock in the mine. The ore requires to be roasted, and is easily worked up

The Zimmerman Fruit Drier.

We give on this page engravings showing two sizes of the Zimmerman fruit drier, an apparatus which is claimed to be well adapted to the needs of those who wish to turn the surplus fruit of their orchards into a durable and marketable form. We have known of the Zimmerman drier for some time, and have noticed many good notes of its workings in our Eastern exchanges. We trust it may be found well-fitted to California needs, for a small drier for farm-house use is a thing which every fruit-grower desires. The Zimmerman is certainly worth attention and trial.

The editor of the *American Agriculturist* made a practical test of the Zimmerman drier and pronounces in its favor. In the lack of experience of our own with it, we cannot do better than refer briefly to the results described by our contemporary. The *Agriculturist* says: "We stated last month that the 'Zimmerman fruit and vegetable drier' appeared to be constructed upon correct principles. A subsequent trial more than confirms the opinion formed on a mere examination. This drier is made in several sizes; that shown in the engraving is No. 2, and best suited to general use. No. 1 is of half the capacity; No. 3 is of double the capacity, and only needed by those who dry on a large scale. The machine shown as No. 2 is 6 ft. high, 2 ft. deep and 26 inches wide. Below is a furnace or stove for the fuel. This has a door at the front, and the fire is managed without opening the chamber of the drier. In the bottom are dampers to regulate the admission of air, which, entering, is heated by contact with the furnace, then passes among the fruit, etc., and out through a covered chimney at the top thus there is a continuous upward current which, in the larger driers, is increased by so connecting the smoke pipe with the ventilating pipe, that the ascending current from the furnace helps the upward draft. Trays or racks of galvanized wire are provided to hold the fruit, etc., and these rest upon ledges placed at the sides, as shown in the engraving. The affair is readily portable, and may be used out-doors, or inside, where it can be connected with a chimney. Experience proves, what an examination indicated, that this meets every requirement of a useful drier, and it completely obviates all the difficulties that attend the drying of fruit in the open air. The Zimmerman, by allowing the drying to go on in wet weather, prevents the great loss attendant upon the old method, while the exclusion of light, of flies and dust, joined to the rapidity with which drying is done, remove the other obstacles to the best results. This drier turns out a product so superior in appearance, in color and cleanliness as to astonish those who have never seen fruit properly dried, and so unlike the common sun-dried fruit as to warrant the different name that the Zimmerman Drier and Baker Co. have given to the product of their machines, viz: 'Evaporated fruit.' They claim that fruit thus prepared is worth in the market at least double that dried in the ordinary way."

The Zimmerman driers are being introduced on this coast by Linforth, Rice & Co., of 323 Market, St. S. F., and will doubtless be put into actual use with this fall's fruit by many growers.

A CLEVER CONTRIVANCE.—Last year a clever musical contrivance was exhibited in the Sea Beach Palace at Coney Island, N. Y. (which was at that time described in the *Evening Mail*), which consisted of a number of reeds, producing different notes, on the mouths of which stout paper, perforated in such a manner as to produce various airs, was passed, the wind being driven through the pipes by a bellows, and both the bellows and the rolling and unrolling of the strips of perforated paper being worked by a single pedal. This idea has recently been adapted to the needs of perambulating musicians in London, the instrument being carried on a light truck, and the whole affair worked by a single crank, like a band-organ.

GREECE spends more than 5% of her whole revenue in education.

OFFICIAL STATISTICS OF U. S. RAILROADS.—According to the statistics issued under the direction of the Secretary of the Treasury there have been constructed in the United States since 1830, railroads that at the end of 1878 amounted to 81,818 miles of aggregate length. At the end of 1830 there were 23 miles of railroad in the country; at the end of 1878 there were 81,841 miles. The greatest number of miles constructed in any one year was in 1871, when 7,379 miles were added to the railroad system of the country. No year since 1865 has seen less than 1,000 miles built, and no year since 1849, with the exception of 1861, 1862 and 1864, whose contributions were respectively 651 miles, 334 miles and 738 miles. The only year in which more than 3,000 miles have been built were 1856, 3,642 miles; 1869, 4,615 miles; 1870, 6,070 miles; 1871, 7,379 miles; 1872, 5,878 miles; 1873, 4,107 miles.

CRANSTON HYDRAULIC ELEVATOR.—A correspondent at New York asks for information respecting this machine; and if any of our readers who are familiar with its operation on any gravel claim, will take the trouble to give us the result of its working, we will kindly acknowledge the favor.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Silver in the Coast Range.

EDITORS PRESS:—Silver mines in the Coast Range have not heretofore been regarded with great favor I believe, yet here in South Fork (of Clear creek) district, about seven miles from Shasta, seems to be a very promising silver region.

The Chicago mine, situated two miles from Igo, was first opened some 14 years ago, and has been worked at intervals since, yielding a considerable quantity of good ore, a part of which was exported, and a part worked on the spot.

The vein appears to be a true fissure in granite, is somewhat "bunchy," varying in width from a few inches to eight ft. between walls. The pay streak proper reaches a thickness of two ft., consisting of zinclende, antimonial galena, ruby silver, iron and copper pyrites, in a silicious gangue, and carrying from \$20 to \$400 per ton silver. A considerable quantity of gold is found in the croppings, which decreases with depth. The greatest depth yet attained is 215 ft. from the surface, and the last assay of ore from the bottom of shaft gave \$224.51 per ton in silver, no gold.

There is also a large quantity of a feldspathic material which contains as much as \$18 per ton in silver.

It is the intention of the present company to work this good ore here in a small mill now being erected for the purpose, and to reserve the low-grade stuff for future concentration. The mine is very advantageously situated for working, with abundance of timber and water power in the immediate vicinity.

It is something new in my experience to find a silver mine anywhere but in a desert, yet here is a beautiful country where figs, peaches, grapes, pears and other orchard fruits abound, where clear cool water flows constantly from numerous springs, and the banks of the stream are lined with blackberry bushes loaded with fruit. Game is moderately abundant.

In addition to the Chicago are many other silver-bearing veins, which assay well, and some of which give promise of making large mines when opened, as they will doubtless soon be, when the profitable working of the Chicago is again, as it has been before, an accomplished fact, which, it is hoped and expected, will be in about a month from now. C. H. A.

Chicago Mill, July 25, 1880.

North Bonanza, Flowery District.

EDITORS PRESS:—Supplementary to a series of very interesting letters from your Comstock correspondent, a few details relative to the above base metal mine alluded to in my last may not be thought amiss:

There is at present exposed a large and promising ore-body, more particularly on the 400-ft. level, the only point personally inspected. It is not less than 80 ft. in length, six ft. wide in the 300-ft., and 30 ft. or more in the 400-ft., extending down to the 600, where it is said not to be so well concentrated.

The ore carries a large percentage of sulphurets of lead, iron and silver, which sparkle on every hand like so many diamonds in the sunlight, making it as fascinating a sight as the most enthusiastic of miners could well wish to see.

The best ore gives sample assays of \$25 per ton. The concentrations, which have been worked with good results in San Francisco, Salt Lake City and Denver, assay \$100 per ton, from four to five tons of quartz making a ton of sulphurets—the great and only drawback to their successful working here arising from the absence in this immediate vicinity of reduction works suited to such ores.

One most familiar with the ore, and having the largest interest in the stock, thinks that it can be mined, milled and concentrated for less than \$4 per ton, and that some way will in all probability be shortly provided for working the concentrations. He estimates the entire body at from 15,000 to 20,000 tons, and worth from \$15 to \$20 per ton. A. C. K.

Virginia City, July 26, 1880.

Putting on Battery Screens.

EDITORS PRESS:—It is necessary that the wire gauze should be very tightly stretched on the frames. The usual way is to tack one edge down first, and then the gauze is drawn tight with plyers, and tacked to the other side of the frame. I use what I think a better plan. After tacking one edge of the gauze to one side of the frame, the frame is placed almost vertically on the work bench, the side to which the gauze is tacked being uppermost. The loose edge of the gauze, which is generally wider than the frame, is then clamped down to the bench by means of a hatten and nail, and the frame is then forced toward a horizontal position by bearing upon its upper side with the hand. The gauze is thus strained as tightly as it will bear without tearing, and after being tacked to

the frame, is cut loose from the clamp by drawing a knife across it. If the gauze is not wide enough to work in this way from the side of the frame it is drawn from the end. The remaining edges are then drawn in the usual way with plyers, and tacked. In making a frame the sharp edges inside should be rounded off with a rasp to prevent cutting the gauze in use. A further precaution is to tack or glue strips of stout canvass to the frame, including the cross bars; the strips overlapping the edges by a quarter of an inch. Another strip of canvass or blanket is often placed on top of the gauze to make a tight joint with the mortar when the screen is in use. C. H. A.

THE JAMIN ELECTRIC LAMP.—Lately one of the most interesting of the many recent trials of the electric light, says the *Universal Engineer*, took place at the laboratory of the French Electric Lighting Company in Paris, the object being to test the efficiency of the improved apparatus designed by Prof. Jamin. A large and distinguished gathering of ministers and notables connected with science, industry and public works were present on the occasion. After having described his new lamp, and explained its method of working, the inventor proceeded to show, by various experiments, that by its means the following results could be obtained: The whole of the lamps placed on the same circuit may be lighted and extinguished as often as required. Each lamp contains three or more candles, each formed by two rods of carbon 12-100 in. thick, one of which, were it not retained by means of a brass clip, would be pressed back by a spring, so as to interrupt the electric current which forms the arc. When the candle has burnt to the end, the current consumes the brass clip, the carbon rods are separated by the spring, and the arc is transferred to one of the adjoining candles. By this means the light can be kept up for an almost unlimited time. The lighting and relighting of the lamps is effected instantaneously by means of automatic mechanism, and if one of them should by any accident become extinguished, the others are not in any way affected thereby, but continue to burn with undiminished brilliancy. The light, which is well divided, is capable of being regulated at will, from the soft light of a chamber lamp or night light to that of the full power of the lamp. The electric current can be conducted to a distance of 2½ miles from the electric source by means of a copper wire 1.25 of an in. in diameter, and as far as 10 miles by a wire double that thickness. The experiments made at the trial referred to satisfactorily proved the steadiness of the light obtainable with the Jamin lamp. With respect to the cost of working, it was stated by the inventor that each lamp would require only one-half the power which is necessary to maintain the electric candles extending from the Place de l'Opera to the Place du Theater Francais, in Paris, and careful experiments have demonstrated that this system is capable of effecting a saving of one-third, or at least a quarter, as compared with illumination by means of gas. The results of the experiments were eminently satisfactory, and it is proposed to exhibit to public trial a system which seems to promise to solve the important problem of furnishing a really cheap and manageable method of illumination suitable for factories and other large establishments and towns.

A CURIOUS RAILROAD.—One of the most curious railroads in the world is the 10-inch gauge road running from North Billerica, Mass., to Bedford. It was at first hooted at by the people, but the road was completed, making a length of about eight and a half miles. There are 11 bridges on the road, one of which is over 100 ft. long. The rails weigh 25 pounds to the yard. The road is well built and equipped—one grade is 155 ft. The cars and engines will at first eight create wonder and admiration. Their perfect proportions give them a handsome appearance. They are constructed very near the ground, giving them great advantage of safety. The cars have an aisle with one seat on each side, in the same manner as ordinary cars have two seats. The length of the cars allow 30 seats, each person having a seat to himself. The cars are supplied with closets, water tank, are heated by steam and have all the modern improvements. They weigh but four and a half tons, ordinary cars weighing on an average 18 tons. The trains run at the rate of 20 miles an hour with perfect safety. The engine is placed behind the tender, giving it greater adhesion to the track. They weigh eight tons, and draw two passenger and two baggage cars. The cost of the road was about \$4,500 per mile.—*Railway Gazette*.

PLACER MINING ON GOLD CANYON.—At Gold Canyon, a short distance above Dayton, says the *Territorial Enterprise*, may be seen a reminder of some of the primitive mining camps of California. There are two companies of Chinese engaged in placer mining. One of the companies has in operation a water wheel about 10 ft. in diameter, which runs a pump that drains the mine, while the other party keep the water out of their diggings by means of a hand pump, the stroke of which is in accordance with the length of the arm of the Chinaman who happens to be running it. As to how much the ground is paying per man is not known, but the Celestials doubtless have a much better thing than they would were they "railroading it."

Mining in Utah.

According to the Salt Lake *Tribune*, Utah is coming to the front rank in mining. It abounds in more varied minerals than any other known mining country. In every direction we learn of constant developments, and justly speaking Utah produces more bullion than many cracked-up neighboring States. Its solid dividends come honestly out of the ground and are not borrowed from banks to force stock manipulation. Attention is attracted here now by capitalists from the East and West, who will derive good incomes on the investments made. The output of the leading mines is enormous, and mining men visiting this Territory are well satisfied that all that is said of the different mining districts is within bounds.

From Silver Reef on the south to the northern boundary of Idaho and Montana prosperity in mining is visible. To give a correct list of all the paying mines would be simply impossible, as a great many are owned and worked by individuals who care not to gain notoriety.

New life seems to be instilled into Bingham canyon again. The Stewart No. 1 and No. 2 are preparing for active work; the Old Telegraph, Jordan, Yosemite and Tiewauksee are working along and give good accounts of themselves. In the immediate vicinity of these mines are a number of very excellent prospects which will soon come forward as good paying properties. Among those particularly making exceedingly good showing is the Overland in Carr Fork. The out-crop of this mine is traceable for a great distance. Three tunnels have pierced this prominent mountain with a number of winzes and cross cuts exhibiting a great amount of gold-bearing quartz, assaying well. At the north of the canyon an important strike has been made in the Thrush mine, showing sulphurets ore. This claim seems to be an extension of the famous Tiswankee. Several claims at the head of Black Jack gulch are showing up very well and will soon be ranked among the leading producers. Very encouraging accounts come in from Park City, Cottonwood, Alta, Tintic, Frisco, Minersville, Star and Marysvale districts, which deserve extended mention and will hereafter be described.

The Peril of a Miner.

One of those thrilling episodes that occasionally enter into the life of a miner and illustrate its perils, occurred recently in the Wallace and Ferguson mine at Sheep Ranch. The shaft has two compartments, and is 400 ft. deep. Both compartments are used for hoisting purposes, signal bells being utilized to enable the engineer to distinguish between the divisions of the shaft. One day last week three men went down in the bucket, their destination being the 200 level. One of the trio, Thomas Taggart, got into the bucket, while the other two stood on its top and held on by the cable—the "usual way." Arriving at the 200-ft. station the men stepped off into the level, and Taggart had got partly out of the bucket when the hell in the other compartment gave the signal to hoist. The engineer mistook the signal and hoisted in the compartment in which the men had just gone down. Taggart was in the act of getting out of the bucket—had one leg out and one in, in fact—when the latter started up the shaft. The bucket, with Taggart hanging to it, had proceeded but a few feet when it tipped over, precipitating the unfortunate man headlong down the shaft. At the moment of falling—in utter desperation, as a drowning man grasps at a straw—Taggart caught at the rocky wall of the shaft with his hands. By a miracle of good fortune, one of his wrists lodged in a wedge-shaped interstice in the side of the shaft, and Taggart hung by one arm, suspended in mid-air with 200 ft. of space beneath him. No one can have the faintest conception of the unutterable horror of such position. Enveloped in impenetrable darkness, suspended by one arm over an abyss that invited him to certain death if his frail support should give away, and alive to the knowledge that the descending bucket might precipitate such a catastrophe, Taggart's situation was so inexpressibly horrible that its contemplation makes one shudder. Luckily, however, his comrades comprehended the situation of affairs, and by acting promptly prevented a tragic ending of the accident. Taggart was released from his perilous position, escaping any more serious injury than a severe strain of his physical system and mental faculties.—*Calaveras Chronicle*.

A ZOOLOGICAL CURIOSITY.—One of the most curious animals that New Mexico produces is the jnacholote, as it would, perhaps, be called by zoologists, the salamander. The animal abounds in New Mexico, is amphibious, and is generally found in wet places, the hede of creeks, or other such retreats. The creature resembles a lizard strongly, but with the legs and tail of that animal has a fish's body and head, with a tongue which popular superstition erroneously capable of transformation at the will of its owner into a boring instrument more penetrating than a steel gimlet, and which is used to the great suffering of all wood near its habitation. Two long, ear-like appendages are attached to the scaly head, the whole animal presenting as repulsive an appearance as can well be imagined. One of the most valuable ore bodies was discovered in a Grant county mine recently by the boring of a jnacholote that has ever been exposed in New Mexico.

Experiments in Making Diamonds.

It will be fresh in the memory of some of our readers that a few months ago a statement was made to this effect, that diamonds had been artificially produced in Glasgow by a process not yet divulged, and that, having been examined by the highest chemical and mineralogical authorities, the new gems had been found to satisfy all the conditions hitherto alone supplied by the diamonds from nature's own laboratory. When, however, it became known that the new diamonds were almost microscopical, and that a gem worth a few dollars cost 10 times as much to make, the interest in the subject somewhat diminished. It has, however, revived on the publication by Mr. G. B. Hannay, in the recently-issued number of the "Proceedings of the Royal Society," of the precise method by which he obtained his startling and novel results. And if only as a record of indomitable perseverance against ever-increasing difficulties, of scientific acumen, and of the true application of the Baconian method of research, it is worthy of study. Some idea of the nature of the investigation may be obtained from the fact, that out of 80 complex and expensive experiments only three succeeded. Violent explosions were frequent; furnaces were blown to pieces; steel tubes burst, scattering their fragments around. On other occasions, tubes which had been carefully prepared, filled, welded, and nested in a reverberatory furnace for many hours, were found to have leaked, and spoiled the experiment. "The continued strain on the nerves," writes Mr. Hannay, "watching the temperature of the furnace, and in a state of tension in case of an explosion, induces a nervous state, which is extremely weakening, and when the explosion occurs it sometimes shakes one so severely that sickness supervenes."

The diamond-making experiments were started in September, 1879, when Mr. Hannay made many attempts to find a solvent for the alkali metal, sodium, potassium and lithium. But in no instance could such a solvent be found which did not, in the gaseous state and under pressure, unite with the alkali. Even in the case of hydrocarbons, such as paraffine spirit, containing only hydrogen and carbon, the alkali combined with the hydrogen, setting free the carbon. Now, as we know, diamond is pure carbon; hence, when this element was set free from a pure substance, it was thought that conditions of pressure and temperature might eliminate it in the hard crystalline, adamant form, namely, as diamond. Glass tubes were first employed, but, although of great thickness in comparison with their bore, they were found to be insufficiently strong, and they were replaced by wrought-iron tubes 20 inches long by one inch diameter, and having the diameter of the bore half an inch. In these lithium was heated for many hours to a high temperature in paraffine spirits, and on subsequently opening the tube carbon in a hard form was found within it.

Great difficulty was experienced in getting the tubes perfectly air-tight, and eventually the open end was welded, at a white heat, and by that means alone did it resist leakage. Sometimes tubes would burst with an explosion like a gun. A tube 20 inches long by 2½ diameter and ½-inch bore, was filled with a hydrocarbon made from bone oil, to which some charcoal powder was added in order to keep an excess of carbon in the tube. Its open end was welded, and it was heated for 14 hours with lithium. On opening it a quantity of gas appeared, and some minute pieces of hard carbon, which had evidently separated out from solution. Another similar tube burst at the end of eight hours' heating. A tube of cast-iron, no less than 3½ inches diameter, and with a bore of only three-quarters of an inch, exploded at the end of an hour with a fearful report, wrecking the furnace. Several tubes of steel also burst under the enormous pressure, at last shattering the top of the furnace. The author remarks that in nature the temperature must at one time have been much higher than anything we can now produce artificially; while the pressure obtained at a depth of 200 miles below the earth's surface, is greater than that which any of the materials from which we can form vessels can resist. We now come to the great experiment which resulted in the artificial production of veritable diamonds. A tube 20 inches long by four inches diameter, of coiled Lowmoor iron, was bored so as to have an internal diameter of half an inch. The central bore was surrounded by walls of iron 1½ inches thick, and, of course, capable of resisting an enormous pressure. In the tube was placed a mixture of 90% of bone oil and 10% of paraffine spirit, together with 4 grams (about 62 grains) of the metal lithium. The open end of the tube was welded air-tight, and the whole was then heated to redness for 14 hours, and allowed to cool slowly. On opening it a great volume of gas rushed from the tube, and within was found a hard, smooth mass adhering to the sides of the tube. "It was quite black, and was removed with a chisel, and as it appeared to be composed principally of iron and lithium, it was laid aside for analysis. It was pulverizing it in a mortar, when I felt that some parts of the material were extremely hard—not resisting a blow, but hard otherwise. On looking closer I saw that these were most transparent pieces imbedded in the hard matrix, and on triturating them I obtained some free from the black matter. They turned out to be crystalline carbon, exactly like diamond.—*Iron Age*.

MECHANICAL PROGRESS.

Pounding in Steam Engines.

If a steam engine is properly made and erected it should work smoothly and noiselessly in all parts, no matter how high the speed. They do not always work so, and it is evident to the experienced observer that there is something amiss that there is no occasion for which a little search would reveal. If it were only the noise given out by a pounding engine the annoyance would be great enough to call for speedy suppression; but the pounding alluded to is *prima facie* evidence that a loss is entailed somewhere by its existence. The first impulse of an inexperienced engineer, when his engine pounds, is to get a copper hammer and key up the connecting rod, though it did not need this attention at his hands, as it was not the cause of the row. When he finds this does not mend the matter at all, he then keys up the cross head end. In all probability the noise is then just as bad as at first, so he stops and thinks a minute: "It must be the pillow-block; the shaft jumps in it, and that makes the noise," so he screws down the hinder, and sets up the jam-screws in the side shooks. Now he has it all right, so he waits a minute and listens—"tunk, tunk!" It pounds worse than ever; and by this time he has added about 10 horse-power in friction to the load, and still is as far from the source of the trouble as before. What shall he do? If he is a man who knows nothing about his calling, and cares less, he will say, "Something's wrong about the devilish thing, and I'll be darned if I can see where;" but if he is one who feels that for every effect there is a cause, he will not rest until he corrects it, and perhaps it may not be amiss to give him some hints here as to the cause of pounding:

The working parts of most engines in considerable service have been worn more or less out of truth, so that they no longer act as smoothly as when first erected. Crank-pins and shafts of horizontal engines, especially those working at high expansions, are often by no means round: a sixteenth part of an inch is not an uncommon irregularity. They become flat on the sides opposed to the greatest strain from the incoming steam; and when they are in this condition it is useless to keep them up, or run them, until they are re-turned.

Again, the out-board end of the shaft, which is generally carried on a brick foundation, is very apt to drop from the continued strain and jar of duty. This dropping, of course, affects the alignment of the shaft, and throws the crank out of line besides; this twists the connecting rod from one side to the other, and is a very common cause of noise. The remedy for this, it is plain, is to line the engine up again. It sometimes happens with engines that have small clearances in the cylinder that the piston actually strikes one head or the other from the wearing away of the various connections. The remedy for this is either to put in new boxes, or back up the old ones, so as to make the rods of their original length.

By far the most common cause of pounding in engines, however, is in the valve or valves. If there is not enough lead on the valve, it is easy to see that all the lost motion in the various parts is taken up by the fly-wheel on the return stroke, and noise is the result. Keying up will benefit this sometimes, but not entirely; for it is impossible to take up all the lost motion. If there is not enough cushion on the engine (which really amounts to lead in its effects), the same difficulty is observed. The remedy is to reset the valves; and, if the exhaust-passages are not right, to make them so. It is not unusual to find steam engines in use that have been built to sell, not to run; and in these machines there is little or no attempt to produce any economy of working. If they make the fly-wheel go round, it is as much as the purchaser expects. If a good engineer is so unfortunate as to get one of these traps to run, and finds it in bad condition, let him make it as good as he can in his own time, not in his employer's; for, if he stops the engine for any cause, short of a man in the shafting, the employer is very apt to tell him he does not know his business, and hire some one to fill his place.

Very often a steam engine makes a bad exhibition of itself from no particular derangement of great moment, but from a complication of minor ones; a slight want of truth in some parts; a little delay in the valve movement; a weakness in some of the castings that compose it, so that they spring and buckle under strain so much as to throw other parts out of line. The discovery of these troubles and the rectification of them constitute the functions of a good engineer, and the remedies are usually special, not general, so they cannot be set down here.—*American Machinist.*

Speed of Pulleys and Belts.

The *Engineering and Mining Journal* suggests, in answer to a query, that good practice is to run shafts for machine shops at 120 revolutions per minute; wood-turning at 250; cotton and woolen mills at 300 or 400, and then says that at 600 ft. per minute belts on six-inch pulleys lose about two-fifths of their adhesion by centrifugal force. The article recommends pulleys with wooden rims, "properly made," as safer for four-ft. pulleys than cast-iron pulleys,

which ought not to be run over 400 revolutions per minute. It further says that pulleys and belts are more liable to be affected by high velocities than shafts are, the belting losing contact, and the pulleys losing cohesion by reason of the centrifugal force developed by high speeds.

There are plenty of machine shops running shafting at twice 120 revolutions; there are wood-working establishments that run shafts at over 500 revolutions, and as to belts on six-inch pulleys losing two-fifths of their cohesion by centrifugal force, so much depends upon the position of the shafts and the direction of travel of the connecting belts that a general rule like this appears to be lacking in adaptability. Then the weight of belts between points of contact is an element in the problem, and also the absolute weight of belts. Why a wooden-rimmed pulley is safer, running at a high rate of speed, than a cast-iron pulley, does not appear; perhaps the saving clause, "properly made," may modify the statement enough to change its absolute character, but there are probably plenty of concerns in the country which would be willing to insure four-foot cast-iron pulleys of their own make running 1,200 ft. per minute.

Glass Millstones.

We have already made a brief allusion to the introduction of glass millstones into successful use. We have since noticed in the trade and technical papers numerous references to the success that has attended their introduction into Germany. These accounts report recent improvements in their manufacture, which, in connection with the excellency of their work, must bring them into very general notice among millers. The idea of constructing millstones of glass is said to have originated from the observation that the finest flour was produced by those millstones which have the most glassy texture; from this observation came an experiment which demonstrated that pieces of glass, combined in the same way as the French buhr, and similarly grooved on their surfaces, gave better results in grinding than the buhr millstone. The outcome of this successful experiment, we learn from the *Pottery Gazette*, was the invention, by the Messrs. Thorn, of the glass millstones now made by them, and used in Germany with much satisfaction. Respecting their special merits, we learn, on the same authority, that they grind more easily, and do not heat the flour as much, as is the case with the French buhr-stone. In grinding grist they run perfectly cold.

In making these stones the glass is cast in blocks of suitable size and shape, joined with cement in the same way as the French buhrs, dressed and furrow cut with picks, and pointed hammers. It is suggested that the substitution of diamond dressing machines would give better results.

Without going into the technical points respecting the comparative merits of the old and new millstones, which are given at some length, but which would only be appreciated by practical millers, we note simply our contemporary's opinion that, in the event of the success of certain experiments now making on a larger and more important scale than any previous ones, "this discovery will be entitled to rank as one of the most valuable of recent years as regards the milling industry."

FACING SHEET IRON WITH NICKEL.—We reported quite recently the experiments made by Dr. Fleitmann, of Iserlohn, to render nickel malleable. It seems that he has sought an application of his process chiefly by facing sheet iron with nickel. M. Dumas, the eminent French scientist, gives some details in regard to the process. Sheet nickel and sheet iron are welded together under a steam hammer, the product being such that the thin coat of nickel adheres firmly to the sheet iron, and does not separate from it, whether used when cold or when heated. When malleable sheet nickel is heated to a temperature approaching the white heat, in a porcelain retort, and the air in the latter is rarefied by well-known means, all the gases occluded by the nickel are first expelled, the volume being approximated double of that of the metal itself. Then the volatile metals in the nickel are distilled. The nickel remaining behind has not been impaired as regards its ductility and malleability; and M. Dumas comes to the conclusion that the qualities of Dr. Fleitmann's nickel are due to the presence of zinc which he adds. The latter, it would appear, counteracts the influence of the substances dissolved in the nickel, which cannot be removed by ordinary processes of refining.

THE RELATIVE COST OF MOTIVE POWER.—Mr. Bissinger, M. E., at Karlsruhe, Germany, gives the following results as obtained in his examinations of the several motors in regard to the relative cost per horse for each hour. It will be observed that the examination pertained principally to small motors. The relative cost per effective horse-power per hour is as follows:

100-horse power steam engine.....	7.6
2-horse power steam engine.....	44.3
2-horse power Lehmman's calorific engine.....	28.5
2-horse power Hock's motor.....	40.0
2-horse power Otto gas engine.....	26.4
2-horse power Otto Lang gas engine.....	26.4
2-horse power Schmidt's hydraulic motor, supplied with water from the city water works.....	95.00
2-horse power obtained by horses and a gin.....	45.00
2-horse power obtained by manual labor.....	200.00

Otto's gas motor and Lehmman's calorific engine are the cheapest of the small motors, but are, nevertheless, four times as expensive as the 100-horse power steam engine.

SCIENTIFIC PROGRESS.

Pasteur's Important Discovery—Cause of Cholera in Fowls and its Prevention.

We recently made a brief reference to some experiments made by the great French chemist, Pasteur, in regard to "cholera" in fowls. It would be a great mistake to suppose that the subject is one of interest to chicken fanciers only, for M. Pasteur announces a discovery which has much analogy to Jenner's, and which offers a scintilla of hope that cholera, or possibly even yellow fever, may be placed beside small-pox in the list of preventable diseases. M. Pasteur declares that chicken cholera is caused by a microscopic parasite ("le microbe"), and he has studied its habits until he knows what it feeds upon, and can produce it and kill it at will. This parasite, he says, finds its food in the body of the animal, and, therefore, if microbea be introduced therein, so as gradually to exhaust this nourishment thereafter, the animal is proof against the disease, because the microbes die of hunger. The experiment by which he proves his theory is the most interesting part of his discovery. Of 80 healthy fowls, which had never had the disease, 20 died immediately after being inoculated with the cholera poison in a virulent form. The poison was then very much reduced in strength, and a second score of the fowls were inoculated with it. They all suffered from the disease in a slight degree, but they all recovered, and when afterward inoculated with poison of full strength, only 8 of the 20 died. A third lot of 20 was then inoculated twice with the weaker poison, and only five died, when they were afterward tested with the stronger "mixture." The final score of fowls were inoculated four times, at regular intervals, and thereafter it was impossible to give any of them such a dose of microbes as to cause its death. The conditions of the experiment are said to have been such as to leave no room for doubt as to the results obtained. Consequently, it would seem that chicken cholera must be added to the list of diseases prevented by inoculation. It is a long step from cholera in fowls to cholera in man, and M. Pasteur does not seem to take it. He does think, however, that there is a connection between chicken cholera and a disease common among the negroes of Senegal. The symptoms are very much the same, and, in corroboration, it may be mentioned that the cause of the "sleeping sickness" is said to be eating fowls afflicted by a certain throat disease. This hint opens a wide field for speculation. It is more than 80 years since Jenner made scientific use of the vulgar knowledge of the relation between cow-pox and small-pox, between disease in man and disease in brutes. If M. Pasteur's discovery be not itself a second step, it is no slight thing that it shows the path to be still open.

The Nebula in the Pleiades.

Some 20 years ago, Temple, whilst at Venice, discovered, with a four-inch telescope, a fine bright nebula close to the bright star Merope in the Pleiades. It was elliptical in form, and covered an area of nearly a fifth of a square degree. Temple showed it to Valtz and other astronomers, and it was seen by Peters with the eight-inch equatorial of the Altona Observatory.

Subsequently it was looked for by other observers, either without success, or else seen as a very faint, indistinct object. Even Temple, though it is true with another instrument and in another locality, describes it as being far less distinct than when first seen. Subsequently, when observing at Florence with larger instruments, Temple saw the nebula as large and as bright as ever. Prof. Schiaparelli, of Milan, also observed it with the fine refractor at Milan, and describes it as bright and distinct, and completely surrounding the star Merope, whilst outlying portions seemed to extend as far as Electra. Schiaparelli remarks, it is singular that so many persons should have examined the Pleiades without paying attention to this great nebula, which, nevertheless, is so evident an object on a clear sky. Maxwell Hall, in Jamaica, also found the nebula very bright with a four-inch telescope, and shows it as nearly half a square degree in area. Several astronomers came to the conclusion that the nebula was variable. Others even doubted its real existence, and were inclined to ascribe its supposed observation to the effects of atmospheric action. Of late it has been drawn by several observers, so that its real existence cannot be questioned. During this year it has been looked for by Mr. Common with the great 37-inch reflector at Ealing. The nebula was seen as a distinct object of considerable extent, but beyond it, and right within the Pleiades, were discovered two others, both long elliptical nebulas of tolerable well defined form. There seems reason to believe, therefore, that the entire background of the Pleiades is nebulous.

AN EXPLOSIVE ALLOY.—M. Debray, at the last meeting of the French Academy, exhibited an alloy which, when heated, will explode. "A five-franc piece made of it and held near a gas-flame, will detonate, to the astonishment and alarm of the holder." It is composed of one part of rhodium and two or three of lead, heated in a crucible to a high temperature.

Decomposition of Powder in Cartridges.

In the course of some rifle practices lately in France it was found that the older infantry cartridges did not give the ball its normal velocity (which is about 430 meters at 25 meters from the month of the gun for fresh cartridges of the 1874 model). Comparing cartridges of different dates of charge from 1876 to 1880, the velocities were found to decrease with increasing age of the cartridges, down to 415m. for the former year. With this was also observed a diminished precision with the older cartridges. An examination of the weights of powder and ball revealed too small difference from regulation weight to account for the variations in question. M. Pothier then analyzed the matter in the 1876 cartridges, and found them a mixture of carbon, sulphur, saltpetre, sulphide of potassium, sulphate and carbonate of potash, and aescoribonate of ammonia, with some metallic salts arising from a combination of the brass of the case with the constituents of the powder. The numerical results of this and other cartridges clearly proved a progressive decomposition of the powder in the metallic cases. The quantity of powder transformed in a given time depends on the atmospheric influences, and especially moisture, acting at the time of manufacture or during storage. M. Pothier placed in contact with powder of known composition various common metals, copper, iron, tin, lead and zinc, added a little water, and after some time analyzed the powder anew, when it was found to contain new compounds, including salts of the metal and sulphate of potash, also traces of hyposulphite and carbonate of potash. Zinc and (next) copper wrought the greatest transformations; lead, tin and iron were less active. The influence of heat was also studied. When pretty dry powder is put in a zinc or copper case and hermetically sealed heat does not affect it, but if the powder be moist, heat accelerates the transformation.

BEES AND FLOWERS.—A writer in the *Midland Naturalist* says: "Bees, when gathering honey, seem to me (and I make the remark after many observations) to confine themselves during any given excursion to flowers of the same family. Thus, when I have watched a bee or butterfly gathering honey from a rose, I have found that when it next alights it is invariably on another rose, and on no other flower." To this the editor adds the following notes from Kerner: "Flying insects in their search for nectar frequently confine themselves during their rapid visitation of successive flowers to the blossoms of one and the same species. For example, in a meadow at Trins, in the Gschnitz valley, I saw *Bombus montanus* visiting only the inconspicuous flowers of *Anthyllis alpestris*, whilst the numerous and far more striking nectar-bearing flowers of *Pedicularis Jacquinii* and *P. incarnata* were passed over. Contrariwise in another place, in a meadow in the Padal valley, I saw this same species of bee buzzing from one *Pedicularis* flower to another, whilst passing over the intermixed *Anthyllis alpestris*." On this passage Dr. Ogle, the English editor of Kerner's work, remarks that a similar observation as to the habits of bees was made by Aristotle. "A bee," he says, "on any one expedition does not pass from one kind of plant to another, but confines itself to a single species, for instance to violets, and does not change until it has first returned to the hive."

TESTING ALCOHOLIC LIQUORS.—The following hints in regard to alcoholic liquors are given by Dubrunfaut in a French journal: Commercial alcohol and alcoholic drinks differ from each other partially by a characteristic flavor, partially by different chemical properties. A characteristic distinction is the amount of acid in the different liquors. All pure alcohols contain only 1% of acid, while freshly-distilled cognac shows 3%, and this increases considerably when kept long in barrels. In 10 or 12 years the same cognac will have 8% or 9% of acid, while the original percentage of alcohol is reduced from 64½% to 50%. The quantity of alcohol is decreased both by evaporation and the formation of acid. All other alcoholic liquors show the same changes, and in addition also contain copper. The presence of this metal is easily proved by ferrocyanide of potassium or sulphuric acid. If there is only a trace of copper the dry residue is burned and the ash tested. As a rule, industrial alcohol also contains copper. The percentage of acid varies enough to furnish a test for the addition of commercial alcohol to rum, brandy, etc., as an adulteration, or to strengthen it. The copper, however, furnishes no reliable clew.

INFLUENCE OF LIGHT ON SIZE OF LEAVES.—M. Ch. Flahault, in the *Annales des Sciences*, brings forward additional observations to support his view that under equal conditions the leaves of plants of the same species are larger in proportion as we go northwards, these relatively higher dimensions being due to the duration of light of relatively feeble intensity. In cases where the chlorophyll is formed in the absence of light, it must be formed at the expense of the materials stored up in the tissues. The importance of these reservoirs of nutriment is still greater in case of flowers. Thus, in the case of hyacinths, both blue and red, M. Flahault found no difference in the color of the flowers grown in the light or in the dark, the color being manufactured from the stores of material in the bulbs.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending July 15	Week Ending July 22	Week Ending July 29	Week Ending Aug. 5
Alpha.....	5	4	4	4
Alta.....	1.85	1.40	1.40	1.40
Andes.....	90c	70c	80c	85c
Alps.....	50c	50c	45c	50c
Argenta.....	50c	50c	45c	50c
Atlantic.....	50c	50c	45c	50c
Arora Tunnel.....	50c	50c	45c	50c
Baltimore Con.....	1.30	1.10	1.10	1.10
Belcher.....	1.30	1.10	1.10	1.10
Belmont.....	1.30	1.10	1.10	1.10
Best & Belcher.....	1.30	1.10	1.10	1.10
Bullion.....	2.10	1.65	1.65	1.65
Bechtel.....	1.05	85c	1.05	1.05
Belle Isle.....	60c	75c	60c	75c
Bodie.....	52	61	5	4
Benton.....	1	75c	60c	80c
Bulwer.....	2.80	21	21	21
Boyle.....	55c	35c	30c	10c
Black Hawk.....	2.40	2.35	2.30	2.60
Belvidere.....	140c	30c	30c	25c
Booker.....	40c	45c	25c	45c
Caledonia.....	2.10	2	2.05	1.80
California.....	1	95c	1	80c
Challenge.....	21	2.35	2	1.80
Chollar.....	25c	21	2.35	2
Confidence.....	25c	21	2.35	2
Con Imperial.....	25c	21	2.35	2
Con Virginia.....	1.40	1.05	1.20	1.05
Crown Point.....	1.40	1.05	1.20	1.05
Con Washoe.....	1.40	1.05	1.20	1.05
Champion.....	1.40	1.05	1.20	1.05
Concordia.....	1.40	1.05	1.20	1.05
Dayton.....	1.40	1.05	1.20	1.05
DeFrees.....	1.40	1.05	1.20	1.05
Danew.....	1.40	1.05	1.20	1.05
Day.....	1.40	1.05	1.20	1.05
Eureka Con.....	1.40	1.05	1.20	1.05
Eschschuer.....	1.40	1.05	1.20	1.05
Endowment.....	1.40	1.05	1.20	1.05
Gen Thomas.....	1.40	1.05	1.20	1.05
Grand Prize.....	1.40	1.05	1.20	1.05
Gila.....	1.40	1.05	1.20	1.05
Golden Chariot.....	1.40	1.05	1.20	1.05
Golden Terra.....	1.40	1.05	1.20	1.05
Goodshew.....	1.40	1.05	1.20	1.05
Gould & Curry.....	1.40	1.05	1.20	1.05
Hale & Norcross.....	1.40	1.05	1.20	1.05
Hillside.....	1.40	1.05	1.20	1.05
Highbridge.....	1.40	1.05	1.20	1.05
Homeside.....	1.40	1.05	1.20	1.05
Hussey.....	1.40	1.05	1.20	1.05
Independence.....	1.40	1.05	1.20	1.05
Julia.....	1.40	1.05	1.20	1.05
Justice.....	1.40	1.05	1.20	1.05
Kentuck.....	1.40	1.05	1.20	1.05
Kosuth.....	1.40	1.05	1.20	1.05
Keynote.....	1.40	1.05	1.20	1.05
Lady Bryan.....	1.40	1.05	1.20	1.05
Lady Wash.....	1.40	1.05	1.20	1.05
Leopard.....	1.40	1.05	1.20	1.05
Leviathan.....	1.40	1.05	1.20	1.05
Leadville.....	1.40	1.05	1.20	1.05
Lee.....	1.40	1.05	1.20	1.05
May Belle.....	1.40	1.05	1.20	1.05
Modoc.....	1.40	1.05	1.20	1.05
Manhattan.....	1.40	1.05	1.20	1.05
Martin White.....	1.40	1.05	1.20	1.05
McClinton.....	1.40	1.05	1.20	1.05
Meadow Valley.....	1.40	1.05	1.20	1.05
Mexican.....	1.40	1.05	1.20	1.05
Middleton.....	1.40	1.05	1.20	1.05
Morning Star.....	1.40	1.05	1.20	1.05
North Con Virginia.....	1.40	1.05	1.20	1.05
New York.....	1.40	1.05	1.20	1.05
Northern Belle.....	1.40	1.05	1.20	1.05
New Cosmos.....	1.40	1.05	1.20	1.05
Nevada.....	1.40	1.05	1.20	1.05
Occidental.....	1.40	1.05	1.20	1.05
Ophir.....	1.40	1.05	1.20	1.05
Oriental.....	1.40	1.05	1.20	1.05
Overman.....	1.40	1.05	1.20	1.05
Panther.....	1.40	1.05	1.20	1.05
Phenix.....	1.40	1.05	1.20	1.05
Phil Sheridan.....	1.40	1.05	1.20	1.05
Potosi.....	1.40	1.05	1.20	1.05
Prospect.....	1.40	1.05	1.20	1.05
Raymond & Ely.....	1.40	1.05	1.20	1.05
Richer.....	1.40	1.05	1.20	1.05
Rock Island.....	1.40	1.05	1.20	1.05
Rye Patch.....	1.40	1.05	1.20	1.05
Rough & Ready.....	1.40	1.05	1.20	1.05
Sage.....	1.40	1.05	1.20	1.05
Seg Belcher.....	1.40	1.05	1.20	1.05
Sierra Nevada.....	1.40	1.05	1.20	1.05
Silver Hill.....	1.40	1.05	1.20	1.05
Silver King.....	1.40	1.05	1.20	1.05
Silver Prize.....	1.40	1.05	1.20	1.05
Snooper.....	1.40	1.05	1.20	1.05
Summit.....	1.40	1.05	1.20	1.05
Scorpion.....	1.40	1.05	1.20	1.05
Solid Silver.....	1.40	1.05	1.20	1.05
South Bodie.....	1.40	1.05	1.20	1.05
South Standard.....	1.40	1.05	1.20	1.05
Star.....	1.40	1.05	1.20	1.05
St. Louis.....	1.40	1.05	1.20	1.05
Syndicate.....	1.40	1.05	1.20	1.05
Tioga Con.....	1.40	1.05	1.20	1.05
Tiptop.....	1.40	1.05	1.20	1.05
Trojan.....	1.40	1.05	1.20	1.05
Union Con.....	1.40	1.05	1.20	1.05
Vermont Con.....	1.40	1.05	1.20	1.05
Ward.....	1.40	1.05	1.20	1.05
Wells Fargo.....	1.40	1.05	1.20	1.05
Woodville.....	1.40	1.05	1.20	1.05
White Cloud.....	1.40	1.05	1.20	1.05
Yellow Jacket.....	1.40	1.05	1.20	1.05

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'NT.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co	Nevada	15	25	July 8	Aug 16	Sept 6	Butler Burris	309 Montgomery st
Blackhawk G M Co	California	9	20	July 29	Aug 26	Sept 16	H A Charles	419 California st
Belvidere M Co	California	7	25	July 8	Aug 12	Sept 1	C Van Dyck Hubbard	310 Pine st
Belcher S M Co	Nevada	23	50	June 28	Aug 2	Sept 1	Joe Crockett	327 Pine st
Champion M Co	California	7	25	July 8	Aug 12	Sept 1	Joe Crockett	327 Pine st
Best & Belcher	Nevada	13	50	July 19	Aug 23	Sept 1	W Willis	309 Montgomery st
Chollar M Co	Nevada	4	50	July 19	Aug 23	Sept 1	W Willis	309 Montgomery st
Con Imperial M Co	Nevada	12	10	July 15	Aug 19	Sept 9	W Willis	309 Montgomery st
Con Pacific M Co	California	2	50	July 15	Aug 19	Sept 9	W Willis	309 Montgomery st
Con Fort G S M Co	California	42	50	July 15	Aug 19	Sept 9	W Willis	309 Montgomery st
Dr Press M & M Co	Nevada	11	20	July 21	Aug 24	Sept 13	W Willis	309 Montgomery st
Dudley M Co	California	9	25	July 10	Aug 12	Sept 8	E C Masten	309 Montgomery st
Gen Thomas M & M Co	Nevada	6	50	July 20	Aug 24	Sept 14	W Willis	309 Montgomery st
Hale & Norcross S M Co	Nevada	65	50	Aug 2	Sept 6	Sept 23	J F Lightner	309 Montgomery st
Highbridge S M Co	Nevada	4	50	July 15	Aug 20	Sept 10	J W Newlands	310 Pine st
Ivanpah Con M & M Co	California	2	173	June 19	July 24	Aug 11	E J Friedlander	300 California st
Jupiter M Co	California	9	40	July 14	Aug 16	Aug 11	E C Masten	18 Nevada Block
Leviathan M Co	Nevada	11	15	July 21	Aug 27	Sept 21	F A Priolo	330 Pine st
Mammoth S M Co	California	5	50	July 16	Aug 20	Sept 10	A W Hodge, Jr.	302 Montgomery st
Mexican G & S M Co	Nevada	12	10	July 15	Aug 19	Sept 8	C L McKee	309 Montgomery st
McDiablo M & M Co	Nevada	3	200	June 28	Aug 2	Sept 20	Chas N Shaw	408 California st
McCracken Con M Co	Arizona	5	40	June 28	Aug 2	Sept 20	A Wenzelburger	216 Sansome st
Monte Cristo Con M Co	California	3	10	May 26	July 5	Aug 5	Butler Burris	309 Montgomery st
Mr Potosi Con M Co	Nevada	4	25	July 15	Aug 21	Sept 7	E A Holmes	318 Pine st
Murphy G & S Co	California	4	25	July 13	Aug 12	Sept 11	S D Rogers	328 Montgomery st
North Bonanza S M Co	Nevada	4	25	June 30	Aug 4	Aug 25	W W Stetson	309 Montgomery st
Occidental Con G M Co	Nevada	4	25	June 30	Aug 4	Aug 25	W T Smith	402 Montgomery st
Oro M Co	California	4	25	June 30	Aug 4	Aug 25	W T Smith	402 Montgomery st
Savage S M Co	Nevada	45	100	June 23	Aug 3	Aug 23	E B Holmes	309 Montgomery st
Scorpion S M Co	Nevada	8	10	July 19	Aug 23	Sept 3	Geo R Shipney	310 Pine st
Segregated Belcher M Co	Nevada	17	100	July 31	Sept 3	Sept 24	Geo D Edwards	414 California st
Silver Hill M Co	Nevada	11	25	July 17	Aug 23	Sept 13	W B Dean	309 Montgomery st
Sierra Nevada S M Co	Nevada	11	100	June 22	July 27	Aug 16	E L Parker	320 Sansome st
Phil Sheridan G & S M Co	Nevada	10	25	June 22	July 24	Aug 14	D L Thomas	327 Pine st
Tuscarora M & M Co	Nevada	6	15	June 26	Aug 2	Aug 23	M R Sperling	309 California st
Vortex M Co	California	1	05	July 12	Aug 36	Sept 6	G W Fisher	324 Pine st
Yellow Jacket S M Co	Nevada	33	10	July 10	Aug 17	Sept 16	Merced Otey	327 Pine st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'NT.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Butte Hydraulic M Co	California	4	100	June 22	July 27	Aug 17	L L Denney	729 Montgomery st
Cabotia M Co	Mexico	1	20	July 26	Aug 26	Sept 10	E A Holmes	309 Montgomery st
Cumberland G & S M Co	Arizona	1	30	June 8	July 9	Aug 9	Joe H Griffiths	328 Montgomery st
Excelsior Deep Gravel M Co	California	11	10	June 16	July 17	Aug 9	D B Chisholm	327 Pine st
Elmwood M Co	Nevada	1	15	July 14	Aug 30	Sept 30	E A Holmes	318 Pine st
Orange Keystone S M Co	Nevada	3	50	May 26	June 29	July 31	E E Lyle	330 Pine st
Peck M Co	Arizona	2	100	July 21	Aug 13	Sept 27	O T Bridge	224 California st
Quartz Mountain G M Co	California	8	100	July 30	Sept 6	Sept 20	E Hestres	729 Montgomery st
Rowe G M Co	California	1	10	July 8	Aug 7	Sept 6	S D Rogers	328 Montgomery st
Swamp Angel G M Co	California	10	200	June 19	Aug 2	Aug 14	Edward Lande	309 Montgomery st
Yuba G M Co	California	10	200	June 19	Aug 2	Aug 14	Edward Lande	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alta S M Co	Nevada	W H Watson	302 Montgomery st	Annual	Aug 19
Belcher S M Co	Nevada	R Weger	414 California st	Annual	Aug 19
Gipsy Queen G M Co	Nevada	Ellis Edwards	330 Pine st	Annual	Aug 14
Independence M Co	California	F M Hall	327 Pine st	Annual	Aug 14
Leviathan M Co	Nevada	W W Bausman	409 California st	Annual	Aug 9
McCracken Con M Co	California	W W Bausman	314 Bush st	Annual	Aug 21
Phil Sheridan G & S M Co	Nevada	W W Bausman	409 California st	Annual	Aug 9
Sikonyou G & S M Co	Nevada	A Judson	320 Sansome st	Annual	Aug 17

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Black Bear Q M Co	California	W L Oliver	Safe Deposit Bldg	25	May 18
Consolidated Virginia M Co	Nevada	A V Havens	309 Montgomery st	50	July 15
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	July 20
Father De Smet Con M Co	Black Hills	Theo Widmann	404 Montgomery st	50	June 30
Napa Quicksilver Con M Co	California	W W Parrish	330 Pine st	10	June 10
New York Hill M Co	California	J B Leighton	727 Clay st	25	June 25
Northern Belle M & M Co	Nevada	W W Willis	309 Montgomery st	75	July 15
Standard Con M Co	California	W W Willis	309 Montgomery st	75	July 12
Seventy-six S M Co	Nevada	E F Stone	305 Pine st	03	May 24

The Mining Share Market.

Since our last issue the mining share market has undergone one of the sharpest depressions which has been experienced for months. The depression of shares was sudden, and the reaction immediate. There was no apparent cause for the movement, either downward or upward; but it happened all the same as if it had been decreed, as it doubtless was. Between Monday and Wednesday the advance in several of the Comstock shares ranged from 25% to 75%, and the volume of transactions was large, as for example, there were at least 3,000 shares of Union sold. At the present time the market is strong, and there is a very confident feeling among dealers.

The decided improvement in shares and the strong tone of the market was undoubtedly caused by the news from Virginia City that an important and unlooked-for development of ore had been made in Sierra Nevada. The present indications are that in the work connecting the Union shaft and the 2500 station of the Sierra Nevada incline there are 35 ft. of good ore. The workings have not yet been connected, but both are in ore; the work from the Union shaft has been in ore for 15 ft.

There has also been an improvement in Bodie shares for cause. On the 3d instant news came from that district of a strike in the 600 of the Jupiter mine. This is an interesting occurrence, from the fact that that level of the Jupiter is the lowest point in the district at which ore has been discovered or the working of any mine has reached. The news helped Jupiter to rise easily, and other shares kept him company.

SISKIYOU COUNTY MINES.-A correspondent at Russian creek, Siskiyou county, writes that the quartz mining interest in that part of the county is looking up under the rich discoveries recently made. The strikes were made on the South Salmon river, about three miles from the Black Bear mine. A working test, that is, by mill process, of a fair sample of the ore from a 15-inch ledge-one of the discoveries-yielded at the rate of \$150 in gold per ton; and some of the specimens are enormously rich in gold. Two new 15-stamp mills are to be built-one for the Uncle Sam, a large and rich gold-bearing ledge, and the other for the ledge recently discovered. The mines generally are owned and worked by poor men, and although their mills are small, the merit of their mines enables them to pay their way. One of these days, adds the writer, this camp and others adjoining will do better, and you may expect to hear of our regular shipments of gold bullion.

Bullion Shipments.*

Since our last issue, we have noticed the following bullion shipments:

Northern Belle, July 26, \$9,600; Christy, July 28, \$5,800; Star, July 29, \$3,400; Con. Virginia, July 31, \$48,417.19; Star, July 31, \$2,632; Con. Virginia, Aug. 3, \$51,528. At Salt Lake, July 26 to 31, inclusive-Horn Silver, \$36,500; Ontario, \$42,059.33; Barbee & Walker, \$2,758.36; Christy, \$3,846.95; miscellaneous, \$31,735; total, \$116,899.64. Total shipments for July: Plumas Mining and Water Co., per N. Cadwallader, Pres., \$13,723.03 in gold; Northern Belle, \$118,200; Con. Virginia, \$213,214; Bodie Con., \$28,632; Bulwer, \$8,619; Noonday and North Noonday, \$61,493; Standard, \$145,019; miscellaneous, \$6,900.

*Desiring to make our list of Bullion Shipments as complete as possible, we will be thankful to receive from mining Superintendents and Secretaries notice of all bullion shipments from their respective mines.

CALIFORNIA AND THE CENSUS.-A Washington dispatch to the Chicago Tribune of the 17th says: The idea that California's wealth consists mainly in its gold and silver mines may be dispensed with. A forthcoming statement to be issued by the Census Office will attest that part by showing a difference of several million dollars in the amount of real estate taxable over personal property, the city of San Francisco alone paying nearly one-half. The Census Office is now engaged in preparing tab

DEER SPRING DISTRICT.—We learn from Mr. S. D. Wood-bull, the metallurgist of this district, that work is vigorously prosecuted on the Horton mine. Work was started three days ago in a tunnel following the footwall of the ledge. It is now in a distance of 65 ft. and in a few days the work of crosscutting to prospect the vein will be commenced.

NOTES.—W. A. Greenly is down 20 ft. in a shaft on the Whiteman, an adjoining claim on the same ledge as the Horton. Some rich ore is being taken out. Next week about 2 miles from the Horton. This is a fine strong-looking ledge, the ore from the croppings assaying from \$50 to \$300.

ROUND VALLEY DISTRICT.—It is claimed that an extensive ledge of tin ore, cropping out boldly near the summit of the Sierra and overlooking this valley, is a somewhat late discovery. Still south of this supposed tin mine is another discovery of gold-bearing quartz.

MONO.

LAKE DISTRICT.—Mammoth City Herald, July 24: The measurements of the Mammoth now given are from actual survey, and can be relied upon as exact. In No. 2 tunnel a distance of 32 ft. has been run since last report, giving a total length of 775 ft. A crosscut has been started 222 ft south of the last crosscut on same level. In No. 3 tunnel a distance of 40 ft. has been made; total, 775 ft. A crosscut was started west in this tunnel this morning 204 ft south of the last crosscut on same level. During the week 354 tons of ore have been sent to mill. The ore chutes having been put in thorough repair, by Monday next the company will send from 90 to 100 tons to mill daily.

IF. & M. C. JOINT TUNNEL.—Distance run since last measurement, 20 ft; total length, 921 ft. The new National drilling machine was started on Thursday afternoon, and is working splendidly. Mr. Crittenden showed us to-day a piece of rock from the face of this tunnel. It is a dark, fine-grained quartzite filled with iron pyrites, which drills almost like flint and breaks short. To-day the drill cut seams to beginning to show themselves, and once more the hope of breaking through into softer material is revived.

HOMER DISTRICT.—Mr. Fred Weber, who has just returned from a prospecting trip through Mono, has shown us a sample of ore taken from the Ida Elmore, former district, 6 ft from the surface, that fairly sparkles with gold, and a certificate of assay of ore taken from the croppings runs \$1000 a ton of silver. This ledge is 4 ft wide, with strong and well-defined walls.

NOTES.—*Index*, July 24: Mr. Hawk informs us that he expects shortly to put a force of men to work on the Ontario Nos. 1 and 2. They are very promising locations, situated a short distance southeast of the Homer mine.

BONA VISTA.—Operations are being steadily pushed on this mine. A large ledge on the face of the tunnel came into view of very high-grade ore about 16 inches wide.

LAKE VIEW.—James McDonald is pushing work on this mine. He is taking out some splendid free gold ore, several tons being now on the dump ready for crushing, with plenty more in sight.

LITTLE BLICK.—W. D. Wasson is opening up this mine with a force of 3 men. The Little Bluck lies a little west of the Homer property, and is considered one of the very best mines in the district.

TIOGA DISTRICT.—W. D. Wasson has shown us some good-looking rock from an immature ledge he has discovered in this district, which he located under the name of the Lucky Strike. The ore is a heavy gray sulphuret, carrying considerable iron pyrites, and looks as if it would assay high in silver. Mr. Wasson says the ledge crops out fully 40 ft. in the face of the hill, and is of the size of the piece shown in eight on the surface.

BONN DISTRICT.—*Free Press*, July 30: If a reasonable amount of water could be brought to bear on the placer claims on the east side of the ridge, the owners could realize a handsome return for their labors. As it is, but little water can be secured and then but for a short time during the day. The returns, however, amount to considerable sums, which is quite sufficient for some people these dull times. The patent concentrator in use there is doing good work, it is said.

NEVADA.

SPARRO MINE.—*Transcript*, July 29: This is a recent discovery, and is located on Deer creek, about one-fourth of a mile east of the Providence mine. Two tunnels have been run into the hill, one higher than the other, and a chute from the upper to the lower one connects the two, down which the ore is dumped, and conveyed to the mill, which is near by. A ledge was discovered cropping out on the hillside, which upon running the tunnel a short distance was found to be from 1 to 3 ft thick, which shows well in sulphurets and free gold. A fine body of ochre from 6 inches to a foot thick also encases it between the walls. About 1,000 tons of ore have been uncovered in the two tunnels. A 4-stamp mill, which was completed about four weeks since, run by water power, is kept busy night and day in crushing the rock, which pays from \$20 to \$50 per ton.

FORTUNA MINE.—*Herald*, July 29: Drifting will be commenced in the new shaft of the above mine at the commencement of next week. A 12-ft sump is now being sunk. The rock that has thus far been taken out looks well. Several loads of the same is now being crushed, the result of which will be known in a few days. The ledge grows bigger and looks better on sinking.

LOWELL HILL.—The Morgan gravel mine is employing about 25 men. The company expects to increase the force to about 50 in a couple of weeks. The gravel that is at present being taken out pays from \$2.50 to one-half an ounce to the car load.

DEWEY HILL.—The Dewey mine they have lately returned to gravel. Prospecting is still going on, and will continue to run on the main tunnel. A short time back 80 car loads were run out, and gave a yield of \$775.

OMEGA DISTRICT.—The Tully and Hinds claim, in the above district, is looking well. They are now making their yearly clean-up, and the bedrock is yielding from 2 to 5 bits to the pan.

AS ORE GRAVEL MINE.—*Poathill Tidings*, July 31: The Mammoth blue gravel mine, near Dutch Flat, is a revamped consolidation of 12,000 acres, 1,000 of which is patented land. In old times it sent out \$17,000,000 in dust, one nugget bringing \$5,000 cash.

CONFART.—This mine is working near 50 men and taking out a fine quality of gravel. Much of this is crushed in the mill at the mouth of the tunnel and a long line of sluices are arranged to save the sulphurets and black sand.

CENTENIAL.—This mine has its new shaft finished and the lower levels are expected to be relieved of water in a day or two, when ore extraction will be resumed with much better facilities than heretofore.

JOHN BERRY.—*Transcript*, July 31: John Hussey, of this district, was down yesterday. He reports the water falling in that district. He has cleared the water out in his claims for the season, and appears well satisfied with the result of his season's work. The Birdseye or English claims are still running, although their supply of water is limited. The Hayward or Nevada claims are running with a full head of water.

NEVADA CITY NOTE.—A large quantity of gold dust, from the river canyon, weighing a drift of about 200 ounces, was yesterday brought to the Citizens Bank from one of the gravel mines adjacent to Nevada City.

CROCKER NOTE.—The mines are all working in spite of the heat, which is intense; the thermometer ranging from 90 to over 100 in the shade.

NEW YORK HILL.—*Grass Valley Union*, July 31: At the annual election of the board of directors of the New York Hill was re-elected. They declared an annual dividend of 25 cents per share, payable on the 10th of August, which goes to show that the mine is yielding profitably and the future prospects encouraging.

PLACER.

DUTCH FLAT NOTES.—*Forum*, July 31: All the men are at the mines, at the mills, or otherwise engaged, making preparations for a grand financial harvest. The mines, generally, have never before for years averaged as large returns as at the present time.

LARGE BLASTS.—There was a huge blast set off in the

Polar Star mine on Tuesday, and one in the Southern Cross on Wednesday. These will probably be the last large blasts in these mines this season.

NOTES.—The Rising Star M. Co., of Colfax, paid its first dividend under the new company on the 23d inst., amounting to \$7,500.

MICHIGAN BLUFF NOTE.—*Cor. Placer Herald*, July 31: Our camp has a "lost ledge," "more than half gold," and all the usual incidents of similar stories, and a party has been organized to search for it.

SHASTA.

WHISKYTOWN NOTES.—*Cor. Redding Independent*, July 25: Mining prospects at this place are becoming better every day. Julian & Muchmore have discovered a fine appearing ledge on Whiskey creek, about 2 miles from town. They have sunk 10 ft. on a vein about a foot wide dipping into the hill. The rock will go about \$80 to the ton, and is getting still better as they descend. They intend running a tunnel to tap the ledge about 50 ft from the surface.

A RICH MINER. Mr. Banghart, who undoubtedly has the rich mine of Shasta county, is still working away. His last tunnel is in about 400 ft. He recently ground up 3 tons of rock and earth, which he had previously thrown away as worthless, out of which he got \$37 to the ton. He is now running his astras by horse power, but next summer will put in steam. The wealth of this mine is found in pockets and seams. The present rich streak is a feeder from Old Mad Mule gulch, which in early days was very rich. This mine has been worked for 15 years, and will last a generation to come.

SHASTA NOTES.—This is without doubt the best mining district in the county. Those engaged in mining are making a good living, and a number of them are laying by something for a rainy day. They are shipping from \$5,000 to \$8,000 monthly. Many placer and hydraulic mines are owned and worked by Chinamen. The Church Hill and Dudley hydraulic mines are owned by the Wong Foy Co.

SCORPION.—The Scorpion and the Cold Spring mines have been bonded to San Francisco for six months, for \$12,000, \$2,000 paid down. Notwithstanding the existence of this bond, the owners are still taking out rock and crushing with two astras. The rock will run about \$50 to the ton.

OLD WASHINGTON M. & M. Co.—This mill is running night and day, and is crushing 5 stamps each. The mine is distant from the mill about a mile, the rock being hauled over a passable wagon road. One hundred and thirty tons have been crushed but not cleaned up, and there are 70 tons lying on the dump. A clean-up will be made in about two weeks.

SIERRA.

GOOD HOPE EXTENSION.—*Mountain Messenger*, July 31: Wm. Meserve brought down some very rich rock from the Good Hope Extension; in fact it is the best we have yet seen. He finds good rock as far as Sailor ravine, to which point the ledge is plainly traceable.

BLACK JACK.—We are informed that very rich rock has been struck at this mine at the head of Junior canyon. How extensive the find may be we have no means of knowing.

NOTES.—The Bald Mountain Extension tunnel is making good headway, being in nearly 2,200 ft. Recently considerable water has been encountered, and the builders are growing larger. The American company, Morris-town, will finish cleaning up in about 2 weeks. Morse, of Eureka, will soon return to clean up. Butcher Ranch mine, owned by Jo. Hutchinson, cleaned up \$1,505, after less than 2 months' run. Work is progressing on the Forest Queen ledge, owned by Biber and others.

TRINITY.

CLARKING UP.—*Journal*, July 31: Gold dust is beginning to come in at a lively rate, as miners have commenced cleaning up in several sections. It is probable that this will continue until the end of next month before the operation is completed. The yield in this county the present year will be somewhat in excess of the average. We should be glad to know how much our miners take out, as such information is eagerly sought by parties desirous of investing in the mines of this county.

TULARE.

MINERAL KING NOTES.—*Cor. Times*, July 23: The Empire mill dropped its first stamp this afternoon at half-past 2 o'clock, and prospects are fair for an indefinite continuance.

ITEM.—Mining interests will take a more lively turn soon; all have been waiting for the Empire to start up its mill, and if it makes a good clean-up on the first run, it will give great encouragement to the waiting.

TUOLUMNE.

SONORA NOTE.—*Union Democrat*, July 31: After a 10-day run with 10 stamps, crushing 115 tons of ore from the Confidence mine, a clean-up was made Wednesday. The result was \$7,000 in free gold and 2 tons of sulphurets, which will add materially to the yield. The ore worked came from the recently discovered chute, which promises to be very valuable, bringing the mine back to its former days of prosperity.

NEVADA.

WASHOE DISTRICT.

UNION CON.—*Gold Hill News*, Aug. 4: The drift north and east on the 2500 level, to connect with the station of the Sierra Nevada incline, is making 3 ft per day. It is run without timbering, and to get necessary ventilation. The face is in fair grade ore, which promises well. To meet this drift, one has been started from the incline station, and that is also in streaks of ore.

OTHER.—The drift southwest on the 1000 level has been pushed forward during the past week at the rate of 4 ft per day. Rapid progress is made in the joint Mexican crosscut east on the 2500 level, and in the south drift on the same level.

SIERRA NEVADA.—The raise from the 2300 level for the old shaft progresses well. The north drift, 2400 level, has been stopped for a short time. The 2500 level of the incline has been connected with winze No. 1 of Union.

OVERMAN.—The incline raise above the 700 level is progressing as usual, and the formation carries seams of good looking quartz.

CALIFORNIA.—The slopes on the 1650 level continue to yield as usual, and the ore is of greatly increased value, averaging over \$40 per ton.

BECKER.—The diamond drill is running southwest from the south drift on the 2700 level, but has as yet encountered only soft porphyry and quartz.

CROWN POINT.—Have started east again on the 3000 level, and as soon as the drift is opposite the workings in Belcher, it will be sent south to connect with that mine.

SAYAKO.—Being from the 1300 level to strike at a greater altitude the body of low-grade ore found by the crosscut east. The work progresses well. The bulkheads will be completed during the week, and will be closed on the 2400 and 2300 levels at the same time.

MEXICAN.—The east crosscut on the 2300 level has made 20 ft since last report, and is without particular change of formation. The drain on the 2300 level and in the main lateral drift progresses well.

CON. VINCIN.—From the slopes on the 1750 level the usual amount of ore is taken. The joint Best & Belcher winze, from the 2000 level, is sinking at the usual rate, and the progress in crosscut No. 1 east, and in the drift south on the 2300 level, is good.

YELLOW JACKET.—The east drift on the 2828 level is getting some water, and a strong flow has been struck by the diamond drill on the 2700 level. Work in the sump drift on the 3000 level progresses well.

CHOLLAR.—Water flowing into the C. N. S. shaft still decreasing. It is expected that the bulkheads of the Savage will be closed this week, so that work south toward Potosi can be resumed.

BEXTON CON.—Running north on the 2050 level. The lateral drift is already getting some fine-looking quartz which gives low assays. As the drift is advanced, it will cut further into the vein.

QUINN.—Work confined to the old shaft, the south drift and the drift 40 ft north of the old shaft. The latter is in quartz and clay, the former giving low assays.

ALTA.—Since completing the station on the 2050 level a lateral drift has been started and run south 28 ft. The face is in porphyry carrying considerable water.

LYNN.—Sinking the 3d level, and running east on the 1850 level in hard rock. Work in both places progresses well.

ALPHA.—Cutting soft rock in the north drift, 2810 level, making it necessary to timber the drift; total length, 245 ft.

EXCHANGER.—Cutting a station preparatory to running the diamond drill on the 2600 level in an easterly direction.

AURORA DISTRICT.

THANKSGIVING.—*Emeralds Herald*, July 31: There are now on the dump nearly 300 tons of fair ore, and in sight in the mine are 15,000 tons, estimating 15 ft to the ton. They have run across the ledge 55 ft, but allow for waste 10 ft, which will leave 40 ft of quartz. South drift on the footwall is 55 ft; north drift on footwall 42 ft. South drift on the hanging wall 50 ft; north drift on hanging wall 51 ft; ledge on the surface 80 ft above, about 20 ft thick, which would make a solid mass of quartz 80x80x30, equal to about 18,000 tons. Some 2,244 lbs. an average of the 40 ft of ledge, milled at the miners' mill, went over \$20 per ton.

KRAL DEL MONTE.—During the past week, sinking the main shaft has been steadily carried on, the distance sunk averaging about 3 ft per day. The total depth is now 630 ft. The formation is changing rapidly, and is of a very kindly character, being much more solid than heretofore. Some very promising strata of quartz are now making in the bottom of the shaft.

GRAND TRUNK.—The east drift has been extended about 30 ft during the week, and broke into the ledge last night. The ledge in this drift appears much stronger than on the surface, although they have not cut into it far enough at this writing to tell much about the value of it.

ONTARIO.—This shaft is now about 25 ft deep. The ledge in the bottom is looking much better than at any other point, and in some places carrying a good deal of mineral.

BRISTOL DISTRICT.

HILLSIDE.—*Pioche Record*, July 24: The Hillside furnace is running out a good deal of bullion, which is accumulating on the dump awaiting shipment, but the amount will be somewhat lessened upon the starting up of the cupel furnaces, which are to commence refining bullion to-morrow.

MEXICIA.—In the drift on the 125 level of this mine, running east from the whim shaft to connect with the old workings, a body of unusually high grade ore was encountered, which, upon appearance, will ultimately lead to an important development.

COLUMBUS DISTRICT.

NORTHERN BELLE.—*True Fissure*, July 31: The mine is looking better since our last report. The air drift being now completed, the work of thoroughly prospecting the 4th level will be pushed. The intermediate, between the 3d and 4th level, crosscut has been run in which 4 ft of ore have been struck. The ore gives good average assays. Only 2 days work has been done at this point, but the showing is very favorable.

GENERAL JACKSON.—The incline is now down 185 ft. The crosscut south from the 150 level is again being pushed, work having been discontinued on it some time ago on account of foul air. The ground is looking more favorable than ever, and when the connection shall have been made between the 2 inclines, rapid progress will again be made.

VICTOR.—The main tunnel has been advanced this week a distance of 9 ft. The formation is improving and getting softer.

MORO.—The shaft is down about 30 ft. The ore is very rich, assaying \$30 per ton. The mine will be developed by the owners as far as possible.

MOUNT DIABLO.—Work all through the mine has progressed this week steadily and satisfactorily. The slopes are looking well and producing very fine ore.

CHERRY CREEK DISTRICT.

EL CAPITAN MINE.—*Cor. White Pine News*, July 25: Work on this mine at Silverburg is pushed forward with energy in their lower tunnel. They are working 3 shifts, and expect to cut the ledge in about 6 weeks. The mine is now on the right track. During the past few days they have made a test by working their ore by dry crushing instead of wet, as they formerly have been doing, and the result is most satisfactory. The company will either remodel the old mill into a dry crusher or build a new one.

EUREKA DISTRICT.

RICMOND.—*Louden Mining Journal*, July 10: The usual telegram from the mines at Eureka, Nev., states that the week's run was \$70,000 from 1,100 tons of ore. During the week the refinery produced four bars to the value of \$54,000.

RUBY-DONNERBERG.—The report states that the company's operations are vigorously prosecuted, and the returns are of a highly satisfactory nature, having regard to the fact that development rather than to large ore raisings are considered.

EUREKA TUNNEL.—*Sentinel*, July 25: This tunnel is now in about 1,400 ft, and has a perpendicular depth from the surface of 800 ft. The shale belt has been passed through and the face is in mineral-bearing lime, highly impregnated with chlorides and other evidences of the near proximity of an ore body.

SECRET CANYON.—The Geddes & Bertrand mine, in Secret canyon, has shipped over 30 tons of ore to the Richmond works during the past 10 days.

PHILADELPHIA DISTRICT.

BELMONT.—*Cor. Courier*, July 24: We are extracting ore in the slope and crosscut above the 300 level and north end of the mine, also opening up 20 ft above the 300 level north and south from the upraise, which is looking very promising and producing some very fine ore.

BARRELORE.—Since my letter of July 15th, we have advanced 0 ft in north level, which continues to look well. Five assays made yesterday, from dump, gave \$197.72 to \$1,400 in silver; not tested for gold; ledge 6 ft. North upraise progressing well. The ledge is looking better, and as we advance, the prospects are very flattering indeed. We have a large quantity of ore on dumps awaiting reduction work.

NOTE.—Rich ruby ore is being found in the Morey District company's mine. The work of development is being pushed vigorously. The mill is kept running steadily on ore from the mines, and the bullion shipments are regular.

PARADISE DISTRICT.

OHIO MINE.—*Cor. Reporter*, July 24: Ten tons of ore from the Ohio mine were received at the 300 level during the week, and the consignments of like quantity is on the way; when it arrives the whole will be worked, and if the returns are as good as received by the company from Salt Lake, they will enter into permanent arrangements with the Bullion company for working all ores from the Ohio mine.

PIOCHE DISTRICT.

EL DORADO CANYON.—*Record*, July 24: The new discoveries down near El Dorado canyon are developing grandly, and are said to be immense. Prospect holes on the ledge show it to contain large amounts of ruby silver. One shaft has been sunk to the depth of 40 ft, and the ore for the whole depth is filled with ruby silver.

DAY DRIFT.—The winze in east drift, on 300 level, advanced 7 ft last week; total, 23 ft; bottom in spar and ledge matter, with bunches of ore. Sinking on spar and ore on 400 level; cut large open fissure. The southwest drift on 400 level has been extended 12 ft; total length of drift, 95 ft.

WARD DISTRICT.

MARTIN WHITE.—*White Pine News*, July 24: We learn from parties just in from Ward that ore has been struck in the Martin White main tunnel, but how much of a strike is not known at present. It cannot possibly be the ore

body the tunnel is headed for; that would be expecting too much. The main ore body may be reached in the next 2 months.

ARIZONA.

GLOBE DISTRICT.—*Silver Belt*, July 24: The richest ore in the winze of the Black Morris, at a depth of 150 ft, is 4 ft wide. Four tons of ore taken from the entire width of the vein, and milled by wet amalgamation as a test, and worked to 90% of its pulp value, gave \$330 per ton.

TOWNSHIP.—Development on this mine is being pushed as rapidly as possible, with good results; every opening showing a fine body of ore. There is enough ore in sight to keep the mill running 12 months.

SYLVANUS, No. 1.—Four assays of ore, taken from as many places on the crosscut of the Sylvanus No. 1, with a view of determining the value of the vein, averaged \$57.34—a good showing for so large a body of free-milling ore.

RICHMOND BASIN NOTES.—Mr. L. A. Vall has just returned from Richmond basin, and has shown us some very fine specimens of ore from the Marcano and Dundee mines. If reports are true, these are some of the finest prospects, for amount of work done, in the basin. Mr. Bruce of Richmond basin, brings news of a rich strike in the La Plata mine.

PATAONIA DISTRICT.—*Cor. Citizen*, July 17: The mountain, which gives the camp its name, together with the foothills, is so bewilderingly covered with mineral deposits, and these surface deposits have such an enormous extent, that one is soon at a loss to doubt as to whether the mineral or the country rock has the preponderance.

HOLLAND MINE.—The singular feature of work at all the claims here is the fact that it is not necessary to extract a pound of waste, and at the Holland I saw on the dump 500 tons of ore, and not a particle of waste dump. The developments on the Holland consist mainly of a 65-ft shaft, at the bottom of which is a 25-ft crosscut, every inch of which is in ore.

COLORADO.

SUNNIT COUNTY.—*Cor. Boulder News and Courier*, July 21: Within 2 years fissure veins and contact deposits have been discovered at various points, and now, at Kokomo, Carbonateville, Red Cliff, Conger's camp, Lincoln, Breckenridge, Swan City, Frisco, The Snake, Montezuma, Chihuahua, Decatur, prospecting is lively, and a great many mines are being developed. At Kokomo there are 3 smelters; at Red Cliff, 1; at Breckenridge, 3; at Larimer, 1; at Lincoln City, 1; at Montezuma, 1; and at Chihuahua, 1. About half of these are in operation, and the remainder are so nearly ready that 2 months will see them in full blast. This will give a home market to all kinds of ores, and enable low-grade mines to be worked to good advantage. The ore in the county is carbonates in many places, chlorides, galena of all grades, gold-bearing quartz and sulphurets of all varieties.

CHERRY CREEK DISTRICT.—*Register*, July 23: The well-developed Kent ledge, in Nevada district, is showing up much better in the 700 level than in the upper workings. A fine body of smelter ore has been recently encountered west of the main shaft, which is continuous up to the 300 level. Free gold specimens have been found.

IDAHO.

WOOD RIVER NOTES.—*Yankee Fork Herald*, July 24: Parties just from Galena say there are about 1,500 men in the Wood River and Saw Tooth districts, the greater part of them either prospecting or developing mines. Some very good strikes have been made this season, and nearly all the boys from this section are in possession of mining property. The mines in the different districts are opening up well. The general reports from Wood River are that the mines are many and rich, and that when smelters are once established there it will make a country hardly second to the carbonate camp of Colorado.

LOST RIVER NOTE.—New and very rich silver mines are reported to have been struck on Lost river, about half way between Kennedy's and Antelope creek, and about 60 miles from Blackfoot.

BAY HORSE DISTRICT.—The Custer company and the two smelting companies in Bay Horse districts are now giving employment to the idle labor of these two districts, so that with other works and improvements going on there is work now for every man here who wishes it.

BONANZA CITY ITEMS.—The ore sacked for shipment in the Badger mine the past winter is worth from \$700 to \$800 per ton. It will probably go out to the Bay Horse reduction works for treatment. The mine is looking well, and the Badger can be set down as one of the numerous profitable veins of the district. James A. McFadden has reached a vein of high grade ore in the Fraction, the eastern extension of the Montana mine. The tunnel at a distance of about 100 ft passed through a large body of medium and low grade ore, and a few ft beyond this the true vein, containing several ft of very fine gold and silver ore, was struck.

BOISE COUNTY NOTES.—*Idaho World*, July 27: The Chinese companies drifting in Gold hill, on the Bear River side, have cleaned up the dirt taken out during the past year, and have commenced refilling their dumps. One of these companies employs 30 men the year round.

FLOWMAN'S CLAIM.—The work of cleaning-up commenced in this claim, on Bear Run, last Friday. The indications are favorable for a good yield. This claim was worked by a Chinese company, who leased it last spring. Work will be continued on Mr. Flowman's hill claim as long as water lasts.

ITEMS.—Keane & Hall will not clean-up for some time yet, being unable to get water for that purpose at present. They will continue drifting with their usual force. Three claims, owned by the Bueno Vista Bar Co., are still running on the west side of Elk creek, opposite the city. The water is being used to reduce the ore from the Atlantis alone. A great many other mines are being discovered. Thomas Lowe on Saturday says he saw a man take out 10 tons of ore from a claim near the new discovery of Avery and party, which will average not less than \$300 to the ton.

DEER LODGE COUNTY.—*Butte Miner*, July 27: On the Bear mine a force of 20 men continue the development. From the bottom of the middle shaft the east drift has been extended to a length of 45 ft on the hanging wall side of the ledge. A breast of ore 6 ft wide is being extracted, the bulk of which shows a profusion of native silver, and with it 50% of copper, which of course pays handsomely for shipping. The west drift is in 35 ft, the face being in ore of excellent quality.

HOT SPRING.—There is nothing new to report from this mine except that work on the west shaft has been stopped to await the erection of a whim, as a windlass cannot hoist the ore even as fast as one man can knock it down. The stopes from the west level are looking well and are producing as usual from 12 to 15 tons of ore daily.

DIAMOND.—The shaft which has been excellently timbered in down 83 ft in a body of ore which extends from one side of the shaft to the other with occasional bunches of porphyry. Only 3 men are employed, who extract 6 tons of ore per diem, assaying in the neighborhood of \$30. As the owners of the mine also own a mill, this comparatively low-grade ore can be profitably reduced,

The Mineral Resources of Washington Territory.

No. 1.

A SERIES OF ARTICLES PREPARED FOR THE MINING AND SCIENTIFIC PRESS BY OUR RESIDENT CORRESPONDENT, ELDEIDGE MORSE.

THE SKAGIT GOLD MINES.

The world knows all about the golden wealth found in the streams and mountains of California. Thousands have penetrated to the most inaccessible parts of British Columbia, and have visited the shores and mountains of far northern Alaska in search of the precious metals; but this is the first season that the general attention of the Pacific coast has been directed to Puget sound as a center of mining enterprise, or to the Cascade mountains in Washington Territory as depositories of mineral wealth in gold and silver, in quantities sufficient to compare with its neighbors to the northward or to the southward. None could give any good reason why these precious metals should not be found in these mountains in quantities as great as they have been produced to the northward and to the southward, in each prolongation of the same system of mountains, except that all previous efforts had to a certain extent been unsuccessful. No large quartz mines had been opened up, and no extensive placers, until recently, been struck.

These things have most undoubtedly produced a tendency to sneer at the possibility of ever finding mines as rich in Washington Territory as have been found in California, Nevada or British Columbia. Still, within the past few years, both placer and quartz mines have been found that promise to equal those in British Columbia and Alaska, and possibly to compare favorably with those of California and Nevada. A wide gold-bearing belt undoubtedly exists, crossing the Territory from north to south, the limits of which may be described in subsequent articles. In this number an attempt will be made to give a concise outline of what is already known in reference to

The Mines on the Skagit River.

Like every other river flowing into Puget sound, fine float gold can be found the whole length of the Skagit. In some places the deposits are rich enough to afford small wages to those who are willing to work them.

In 1860 an Indian woman picked up a nugget of gold near the mouth of the Sauk, some 60 miles up the Skagit, which she sold to the Puget mill company at Port Gamble for \$27.

Ever since that time every little while attention would be called to coarse gold brought from the Skagit by the Indians; but prior to 1878 no specimens of coarse gold had been found by white men on that river or its tributaries; at least no report of such finding has ever been made public. Had anyone found coarse gold, the public by this time would have heard of it.

Prospecting that led to the present excitement began in 1877. From five to seven men were at work during the summer and fall of 1877 prospecting the Skagit and its tributaries, finding in many places good prospects of fine gold on the surface, but failing to discover coarse gold. Prospecting was resumed in February, 1878, when a party went nearly up to what is now called Ruby creek. All but two of the party stopped at the Tunnel canyon, some six miles below the creek. The two who went on—John Rowley and John Sutter—struck coarse gold about two miles up Ruby creek. They found in one pan one dollar and a half. They found so many small rubies in the black sand that they named the stream Ruby creek at that time. Then, prospecting up the Ruby, they struck coarse gold in several places. This stream is about eight miles long, and is formed by the union of two streams, since named Granite and Canyon creeks. These men prospected up both of these, but found prospects only on Canyon. They then prospected on Skagit, above the mouth of the Ruby, and found plenty of fine gold, but no coarse. On returning to the Tunnel canyon, another party was met coming up. In June, 1878, of this second party, Rowley, Conn, Duncan and Presentine went up the Skagit, ten miles above the mouth of the Ruby, and failed in trying to cross the mountains into Ruby and the head of Canyon creeks; then they came down to the mouth of Ruby and went up that stream. They panned out some \$15 worth of coarse gold near its mouth. They also found coarse gold up Ruby and Canyon creeks, but were compelled to return for provisions. A freshet came on while their supplies were near the head of canoe navigation, some 16 or 18 miles below Ruby. The freshet had carried off their canoe, leaving them on one side and their supplies on the other, and the river was too high to attempt crossing, and they had to travel nearly three days without food. In September, 1878, Rowley and Presentine were on Ruby again. They found bare bedrock on Canyon creek, and in one day took out \$20.

Having no provisions, tools, etc., they struck out for supplies, and met Sanger, Woods, and Armstrong at the Tunnel House, and again went up Canyon creek, where, in two hours,

the five took out some \$45. They obtained some \$68 in all that day. In November, 1878, Messrs. Rowley, Armstrong, Woods, Pierce, and Casey went in and wintered on Ruby. Cold weather and deep snow prevented them from accomplishing anything to speak of. But in February, 1879, they organized Ruby mining district. Representation day was fixed at July 1, 1879, on which day there were 29 men there; but high water, lack of tools, and other difficulties prevented them from accomplishing anything for a couple of months, and so discouraged the men that half of them were about leaving in disgust. On the last Saturday in August, 1879, several of the party were encamped about two miles below the head of Ruby, having left Canyon creek, on their way out. One of them, Barney McCort, took his pan and crossed the creek. In 20 minutes he took out some two dollars. Five others soon joined him, and that evening they took out \$22. These six men stopped there and formed the Nip and Tuck company, which took out nearly \$800 in six weeks. Then one or two of the company stopped after the rest left for the season, and took out enough more, so it is estimated, to make \$1,000 earned by that company of six men last fall.

Rowley and Presentine, with four others, tried for two months, unsuccessfully, to work the Discovery claim, on Canyon creek. They left about the 1st of September, 1879. When going out they met Sanger and Duncan, and gave them authority to clean up their cut, etc. Armstrong joined them. The three cleaned up \$283 from the abandoned cut and bedrock in a few weeks. In not over six weeks, during last September and October, some \$3,000 was taken out by these three miners. Perhaps as much as \$4,000 in all was taken out last fall. About 60 men in all visited the mines that season; but not over 25 did any work to speak of. The gold taken out last fall was what created the great excitement last winter, and caused the rush to that locality over the snow, until, at the present time, some 1,200 men have visited the mines, over one-half of which number have taken up claims. What the present outlook is will be best understood by

A Brief Description of the Skagit River

And that section of country. This river is about 175 miles long. It rises in British Columbia, not far from the Fraser. One of its tributaries rises within 14 miles of Fort Hope. About 10 miles north of the line the west fork joins it; then for 30 miles the stream flows nearly south to the mouth of Ruby, and except for the jams, the river is navigable for canoes all this distance. For this distance the river bottoms are three miles wide, with timber, climate, etc., like those found on the eastern slope of the Cascade mountains. This is a very peculiar valley, with high mountains each side of it. Mount Baker lies just west of it, 10,000 ft. high; while the main range of the Cascades, from 6,000 to 7,000 ft. high, is just east of it. About half way between the mouth of Ruby and the British line is Lightning creek, which, like Ruby, flows into the Skagit from the east. The tributaries on the west are Eagle creek and Beaver creek. The development of the mines will cause this mountain valley to be settled by hundreds of families, who will grow produce for the mines.

Below the mouth of Ruby the Skagit is a terrible river for some 16 or 18 miles until Goodell's, the head of canoe navigation, is reached. It is but little more than a series of wild cascades, flowing through a succession of very deep and narrow canyons. One of these, some six miles below Ruby, is called Tunnel canyon.

A Remarkable Canyon.

Here also comes in from the east Thunder creek, through a canyon two miles long and 250 ft. deep, and so narrow on top that a man can almost step across it. The creek is nearly 40 ft. wide. In flowing through this canyon it makes a noise like rolling thunder. Its mouth is near the upper end of Tunnel canyon. Here the river was exposed to flow under ground for nearly a mile, and the first prospectors there described it as an "underground tunnel." From above, below and each side it has that appearance. It is only by going to the edge and looking down two or three hundred ft. into the narrow and deep chasm which yawns beneath you that the mistake is discovered. Ruby also flows into the Skagit through a very narrow canyon. For some six or seven miles below Goodell's, although navigable for canoes, the river is very swift and wild, large boulders (in the center of the stream and some bad riffles; then comes the portage, where the boulders are so thick and the fall so great that none but the most skillful can or dare shoot through. In times of high water the waves roll over the boulders from six to 10 ft. high. In very low water the waves may not roll over two or three ft. high, but the boulders are so much thicker on the surface of the water that the dangers are nearly as great. The worst part of this portage is only some 300 yards long, but there are very bad riffles just below the main portage. It was in these riffles six men were drowned on the second of May, 1880. Canoes and batteaux usually are taken through this place with a line, while the freight is all packed around it. In going down only a small portion try to shoot through. Then, no matter what is the skill, a miststroke will consign the whole outfit to a watery grave. At the time of the accident above referred to, the passengers walked around the portage, while the two in charge, Dave Ball and an Indian, shot through all right; then above the lower riffles they took in the 10 passengers; the canoe was fit to carry

six; she swamped; Ball was drowned and five passengers with him; the others were saved by a passing boat. Had this canoe a smaller load, or had the passengers walked 300 yards further, all would probably have got down safely.

Below the portage the country grows gradually smoother, the river easier to navigate, and it is but a short distance to where the valleys are wide enough to cultivate. The branch of the Cascades, of which Mount Baker is the highest peak, may be said to cross the Skagit river at the portage, which is a very narrow canyon, cut across very high mountains, through which the river flows.

Portage City.

Three miles below the portage is Portage City, the supposed head of steamboat navigation. Most of the year steamboats of sufficient power can reach here, although none have gone farther than the mouth of the Sauk, 20 miles below. From Portage City there are no real obstacles to canoe navigation but what can be surmounted by hard work; the riffles are, some of them, swift, but not dangerous to skillful canoe men. The Sauk is the present head of agricultural settlements. Here is a beautiful tract of very fertile land, where there is enough vacant to make homes for hundreds of families. Doubtless it will all be occupied before long.

Eight miles below the Sauk, the Baker river flows into it from the north. It drains the southern slope of Mount Baker. Fourteen miles below Baker are

The Skagit Coal Mines.

The mine is called the Cumberland, on account of the forging qualities of this coal, and its resemblance to the celebrated Cumberland coal. Some seven or eight miles above these mines, the fertile low lands of the Skagit are 10 miles wide, with only a few settlers on the river bank. It is about 16 miles from the coal mines to Sterling, which is quite a logging center, and 10 miles from there to Mount Vernon, which is 12 miles from the sound. Mount Vernon is one of the best known points on the river, and the usual stopping place for sound steamers, and where most of the miners start in canoes to go up the river. It is expected that after another month or so travel will be sufficient to induce steamers to go regularly as far up as the Sauk, and perhaps to Portage City. The country around the mouth of Skagit is considered the most productive in western Washington.

The Snowfall.

Last winter snow fell the heaviest in the mountains and on the sound ever known since the Hudson Bay Company first were here. The forepart of January, in a single week, snow fell over four ft. deep at Seattle and other points on the sound. In the open places, near salt water, it melted nearly as fast as it came; but in the timber back from the water, and in the mountains, it fell much heavier and did not melt. The 1st of March, 1880, the snow probably averaged 10 ft. deep in the mountains. This deep snow commenced falling about the same time as the rush to Ruby creek began last winter. It caught a large number on their way in, just above Goodell. The soft snow was so deep and snow slides so frequent that the first party who broke the trail were 12 days going some 16 miles. After the trail was well broke, a man would carry 80 lbs. and go in in one and one-half days. The troubles of the first lot discouraged some others, so they concluded to try to come in via Fort Hope. There was a wagon road 14 miles from Fort Hope to where it struck the Skagit, thence seven miles farther down it, and an Indian trail to where the two forks joined (at a place named the Steamboat landing) at the head of the upper valley of Skagit, 10 miles from the boundary and 30 miles above Ruby. Here they were to come down on rafts and a-foot along the bottoms. There are no obstacles to a summer pack trail on this route, but the terrible snowstorms of the past winter were so difficult to overcome that the men who came in that way were from 17 to 42 days on the trip. The average was about 30 days. All went out via Goodells and down the Skagit. Some 50 or 60 came in via Fort Hope.

The water in the Skagit river is highest in early summer and lowest in winter. On the tributary streams in the mountains, the melting of the snow makes high water oftentimes until late in summer, and low water during the fall and winter.

Ruby Creek

Is about 40 ft. wide, swift and with many boulders in the channel; three miles of it runs through a canyon so narrow it can be worked only by fluming. At extreme low water it contains about 7,000 miner's inches of water, flowing under one-ft. head. A flume made so the claims there could be worked eight months out of the year, would have to be large enough to carry some four times that amount of water. Winter is the best time to work most of the claims, on Ruby creek, if they are only first opened in the fall.

Canyon and Granite Creeks

Are each nearly one-half the size of Ruby. The past season gold was first discovered on Granite creek, of quality and in quantities sufficient to induce men to take it up. There is very little float gold on Granite. Canyon creek is some 15 miles long. Its chief tributaries are Mill, State and Gatten's creeks. All of Ruby is supposed to be taken, 10 miles of Canyon, about 8 of Granite, State and Mill creeks, while a number on Gatten's, Cedar and other small creeks, are also claimed. Near the mouth of Ruby, in several places, gold similar to that in the bed of the creeks has been found in the

mountains several hundred feet above the head of the creek. Something over \$100 has been washed with snow water there this spring. About \$200 has been also taken out near the mouth of the creek this spring with pan and rocker.

There is a separate mining district for Ruby, Canyon and Granite creeks. Besides these three, another district called Enreka district exists, embracing Lightning creek and its tributaries, where excellent prospects are supposed to have been found on one of its branches, formerly called Three Fools' creek, but now named Eureka creek. Some 40 claims are taken in that district.

About 70 claims are taken on Thunder creek, where is also another district.

This is a very wild and exceedingly rough country, in the most inaccessible part of the Cascade mountains. The gold is similar to Caribou gold in quantity, quality and location; it is quite coarse, but thus far no nuggets above eight dollars in value have been found. No gold to speak of, besides float gold, has been found except on or near bedrock. This has been reached in but few places, and wherever reached the pay has been well distributed and abundant. In Feb., 1878, no snow was on Ruby creek. In the winter following, snow was not at any one time over three or four ft. deep. Last winter set at fault all previous calculations. Men could have worked most all of Ruby, had they had grub and tools in, and claims opened out last fall, all of last winter, despite the big snow; but in the smaller creeks, where the canyons are narrower, the avalanches have filled the canyons from bank to bank with snow from 20 to 150, if not to 200 ft. deep. In many places it has brought down masses of timber, rocks and earth that will be very difficult of removal. The writer traveled for several days over streams that were hidden from sight by snow drifted in, or carried by avalanches, so that for miles at a time the stream would be invisible. There are some of these small streams that poor men could work profitably, if it were not for these avalanches. As it is, about one dozen companies will be almost certain to make money this year, others will make expenses, and others, the greater number, will make little or nothing. With but few exceptions, so far as discovered, these are not poor men's mines. There is, undoubtedly, plenty of gold on the bedrock that will pay to get it out; but it requires capital and experience to handle it. The chief benefit of these mines to poor men will be the sale of claims to strong companies, and what they may make working for wages for these companies two or three years from now, after the mines are well opened. It will probably take a term of years to wash them out. This year they will do well if they finish prospecting, get in good pack trails, and a few take out money that will fairly represent the mines by next September. But little gold can be taken out before August. A trail for pack animals will be put in from Fort Hope, and Seattle merchants, etc., will probably put in another near the present foot trail from Goodells. Another trail may cross from Granite creek to Cascade river, the stream flows into the Skagit four miles below Portage City. A pony trail used by Indians goes over the mountains from its mouth. This trail to it from the mines will furnish an outlet to the east of the mountains, as well as to navigable waters on the Skagit river.

An Overworked People.

At a recent meeting of American physicians and surgeons, William Walter Phelps made the following remarks, which will bear careful and repeated reading: We are a nation without contentment, without rest, without happiness. In a feverish race we pass from the cradle to the grave—successful men, to whom life is a failure. Our boys leave the university when English boys leave their school. Our merchants leave their trade, retiring to some more dignified or honorable work, as they believe it, at an age when the German merchant first feels the master of his trade. We are always anticipating the future, forcing the task of a whole life into part. Worse, we are not content with doing a year's work in a month in our calling, but we must do enough in all other callings to win distinction there. In other lands it is enough to be a lawyer, physician, clergyman, merchant. Here we are nobodies unless we fill the sphere of all human occupations. One must be a statesman and know political science as if already in office. He must be an orator, and ready to persuade and instruct; a wit to shine at the dinner table, a *littérateur*, a critic! There is too much human nature in man for this to mean anything except a discontented life and a premature death. And the remedy? Correct public opinion. We must honor the man who faithfully does his task, whatever it is. Not the task, but the faithfulness with which it is done, must be the measure of the honor. Then men will be content with their father's trade. This will give us that family association which is a sure pledge of good conduct and patriotic love. This will give us, too, that traditional aptitude which alone gives great mechanical excellence. It will not be a bad time for American manufactures when we find stamped on them what Mr. Griggs finds on Japanese bronzes, "Done by the ninth bronzer in this family." Then men will keep the occupation of their youth for their age, and, having leisure, will build the foundations broad enough to withstand bankruptcy. Then men will seek excellence in their callings. Then men will alternate labor with rest, and obey the demand of nature,

THE ENGINEER.

Another Great Engineering Work Completed.

An English exchange gives us the following account of the completion of one of the most stupendous works of engineering skill and enterprise of ancient or modern times. We have been in the habit of crediting the new world with some of the most daring and enterprising improvements, but we can boast of nothing that surpasses this. Says the exchange referred to: "Somewhere about 3,000 workmen, 600 or 700 wagons, 17 or 18 locomotive engines, 3 steam 'navvies,' and a great quantity of minor machinery of various kinds have been engaged since 1875 at the southeast end of London in a work, compared with which the building of the pyramids—with modern appliances—would have been no very signal feat. Hitherto the one entrance to the Victoria docks from the Thames had been at Blackwall point, but now there is a dock capable of receiving all vessels, no matter what they might be. Three and a half miles of walls have been built, enclosing 90 acres of water. These 'walls' are 40 ft. high, 5 ft. thick at the top and 18 ft. thick at the bottom, the whole of this enormous mass being composed of solid concrete, for which 80,000 tons of Portland cement have been used. Some 4,000,000 cubic ft. of earth have been dug out. It may assist the imagination somewhat to state that if it were filled into ordinary carts, the vehicles would form an unbroken line 7,000 miles long. The excavations have gone through submerged forests; and, among other curiosities dug out, have been a reindeer's horn, a Roman vase, and what is supposed to be an ancient British canoe, carved out of solid oak. The latter is now in the British museum. The new entrance below Woolwich will save about three and one-half miles of river navigation, which, in the case of vessels of heavy draft, is of course a matter of very great importance."

Mr. Law's Report on the Tay Bridge.

The Commissioners to investigate the cause of the Tay bridge disaster, Messrs. Rothery, Barlow and Yolland, employed Mr. Henry Law, M. I. C. E., to examine the bridge after the fall of a portion of it to make a report thereon, which could be used as evidence on the trial. As a result he submits a long report, in which his conclusions summed up would make the statement appear as follows: The base of the pier was too narrow, occasioning a very great strain upon the struts and ties, that the angle at which the latter were disposed, and the mode of connecting them to the columns were such as to render them of little or no use, and that the other imperfections which have been pointed out, lessened the power of the columns to resist a crushing strain; and further that the yielding of the struts and ties was the immediate cause of the disaster. Some of the other imperfections alluded to were, first, the defective mode of connecting the columns at the flange joints, the bolts being one-eighth inch less in diameter than the hole, and the flanges being separated in some cases as much as three-fourths of an inch. The concrete was also found to be bad, on account of its inequality. The mode of attaching the ties to the columns by means of lugs was evidently insufficient, as in almost every instance the lugs have been torn away.

THE ENGLISH CHANNEL TUNNEL.—It is asserted that within 18 months two and a half miles of the proposed channel tunnel between England and France will have been excavated, and that the work will be completed in four years, probably by boring from each end. There are evidently, however, contingencies, such as a break in the rock, which may destroy the whole enterprise. Meantime another bold scheme for crossing the channel contemplates a line of steel tubes 16 ft. in diameter, halled so as to make it weigh one and a quarter tons to the foot less than the water displaced, and held at a depth of 35 ft. below the surface (so as not to impede navigation) by being anchored by chains to caissons sunk to the bottom. Through this floating tunnel of 20 miles or so it is proposed that railway trains shall pass. The scheme appeals rather too strongly to credulity.

IMMENSE AGRICULTURAL MACHINE PROPOSED. Mr. Theodore T. Woodruff, inventor of the parlor sleeping car, described, at a recent meeting of the Franklin Institute, his steam motor for cultivation of the soil—an immense machine, estimated to weigh, with water and fuel, about 25 tons, and, as arranged for plowing, estimated to turn 132 ft. per minute. In the drawing the machine was represented with 15 plows, each designed to turn 14 inches wide, so that the machine would prepare ground for a width of 17 ft. 6 inches, at the rate mentioned above. The motor is guided as well as driven by steam, and the plows are adjustable (within limits) to any desired depth, over three acres being calculated as the work possible for the machine. The motor may also be adapted for ditching, grinding, thrashing, sawing, etc.

USEFUL INFORMATION.

THE LARGEST SEWING MACHINE IN THE WORLD.—Mention has already been made, says *Design and Work*, of the modifications of the Singer sewing machine to adapt them to certain kinds of work. The latest of these we must allude to more prominently, and introduce the reader to the largest sewing machine in the world. This gigantic stitcher has just been completed, and may thus be described:—The machine weighs over four tons, and is in some respects of new design, uniting much simplicity of construction with great strength of parts. It is adapted for general manufacturing purposes of the heavier sort, although specially made for stitching cotton belting, an article which is just now taking the market as a cheap and serviceable institution for gasing and the ordinary leather belting. The material used is of great strength and toughness, and is sewed together in plies or layers up to an inch in thickness. The belting in being sewed together is passed through heavy feed rollers some nine inches in diameter and over eight ft. in length, getting stretched and pressed in the process. There are two needles at work, with two shuttles, and the shuttles can be removed from the bottom without disturbing the overlying plies of belting. The rollers between which the work passes are actuated by reversible worm and cam motions, and the machine has, in addition to these roller-feeds, what is known as a top-feed motion, suitable for a lighter class of work. The stitch, as in the ordinary sewing machines, can be easily adjusted from one-eighth inch upward, and the pressure of the rollers on the work passing through the machine can be regulated at the will of the operator. The machine, which is driven by steam, has been made for a manufacturing firm in Liverpool.

THE USE OF COPPER BY THE ANCIENTS.—Copper is widely spread over the face of the earth, and man, in all ages, has adapted it to his wants. It was one of the greatest articles of commerce with the Phenicians, who derived a large supply from the mines of Nubia, that at one time supplied the whole of the known world, and combined with it the tin obtained from the islands of Great Britain. It was used by some of the northern nations of Europe in the fabrication of weapons, at a period and under circumstances when steel appeared to be more precious than gold. This has been illustrated in Denmark, by the opening of many Scandinavian tumuli of very remote ages, and from which have been collected specimens of knives, daggers, swords and implements of industry, which are preserved in the museum at Copenhagen. There are tools of various kinds, formed of flint, or other hard substance, in shape resembling our wedges, axes, chisels, hammers and knives, the blades of which are of gold, while an edge of iron is attached for the purpose of cutting. Some of these tools are formed principally of copper, with edges of iron, and in many of these implements the profuse application of copper and gold, when contrasted with the parsimony evident in the expenditure of iron, seems to prove that at that unknown period, and among the unknown people who raised these tumuli, gold as well as copper were much more common products than iron.

QUICK-SPEED CIRCULAR SAWS.—Soft-iron discs running at a circumferential speed of 12,000 ft. per minute will cut hard steel, but 5,000 ft. per minute will not cut iron. This fact is taken advantage of in rolling-mills to cut large bars and beams to exact lengths. At the L. & N. Western railway works at Crewe, the circular saws for cutting hot steel have a velocity of 13,000 ft. per minute at the periphery, equal to a speed of about 150 miles per hour. The saws are 7 ft. diameter, and 5-16 inch thick, driven through gearing in one case by a pair of locomotive cylinders 17 inches diameter and 2 ft. stroke; in another instance the saw is driven direct by a three-cylinder engine, 14 inches diameter and 8-inch stroke. At another works a saw of 4 ft. 6 inches diameter is run at 1,200 revolutions per minute, equal to 17,000 ft. per minute. A jet of water plays on circumference of saws to keep them cool.

BURNT ALUM.—Ordinary alum is a double sulphate of potash and alumina, containing, when crystallized, 24 molecules of water. When heated, it melts in its water of crystallization, and on continued heating this is expelled, leaving a dry powder, known in pharmacy as *Alumen usta*, or burnt alum. That sold at the drug store is often imperfectly dried, and should be placed for an hour or more in a hot hake oven before use. According to C. Bernbeck, the best test for a good article, is nearly tasteless when put on the tongue, and takes 12 to 24 hours to dissolve in water. Much of the alum now in commerce contains no potash, the alkali being ammonia. Of course ammonia alum cannot be converted into burnt alum, as the ammonia is expelled at the same time, leaving only sulphate of alumina behind.

BONE GLASS.—After extracting phosphorus from bones, a glass can be formed from the residue which consists of lime and phosphoric acid, the ordinary kinds of glass being composed of sand and potash, soda, lime and alumina. Bone glass can be worked as readily as any other glass; it has the valuable property of not being attacked by fluorine acid.

PERFORATING GLASS BY ELECTRICITY.—A simple method of perforating glass with the electric spark is described by M. Pages in a recent number of *La Nature*. The apparatus required consists (1) of a rectangular plate of ebonite, its size, for a coil giving 12 ctm. sparks, about 18 ctm. by 12; (2) of a brass wire passing under the plate, and having its pointed end bent up and penetrating through the plate, not farther. This wire is connected with one of the poles of the coil. A few drops of olive oil are placed on the ebonite plate about this point, and the piece of glass to be superposed, care being taken not to imprison any bubble of air. The olive oil perfectly accomplishes the object of insulating the wire. One has then only to bring down a wire from the outer pole of the coil, on the piece of glass, above the point of the lower wire, and pass the spark. By displacing the glass laterally for successive sparks, it is easy to make a close series of holes in a few seconds.

BEST SUGAR PRODUCT.—The continent of Europe now produces from beets more than one-fourth of all the sugar of all kinds made in all parts of the world. France makes 451,000 tons; Germany, 290,000; Austria, 205,000; Russia, 150,000; Belgium, 80,000; Holland and Sweden, 35,000—in all, 1,211,000 tons. France has about 500 sugar factories, and about as many distilleries for beet spirits and for beet sugar molasses. In this country capitalists are awakening to the importance of this branch of manufacture, and already immense establishments have been organized in some of the Eastern States. The prairies of the West afford the finest field for the cheap production of the beet.

GRAPEVINE LEAVES AS HOPS.—Did any reader ever try using grapevine leaves instead of hops in bread-making? Simply use grape leaves as though they were hops, only, perhaps, requiring a little larger quantity. After having made yeast, just before setting it to rise, stir into it from one-half to one teaspoonful (according to quantity of yeast) of light hop yeast, or that made by soaking yeast-cake in a little warm water, stirring in the flour and allowing it to rise. After the yeast has become light, use as you would hop yeast. While the leaves on the vines are still fresh and green, gather the tenderest and best, dry and save for winter use.—*Inter-Ocean*.

The largest sheet of plate glass in the world has recently been cut at the St. Gobain works in France. It measures 21.15 ft. by 13.43. It is 7-16 of an inch thick. It is white glass and weighs 1,573 lbs. The same works have turned out a silvered mirror 17.90 by 9.94 ft., weighing 770 lbs. The Jeumont works have produced a plate of white glass 17.81 by 11.51 ft., which weighs 1,100 pounds.

PICKLING CUCUMBERS.—To make them keep firm and brittle through the year, steep in strong brine for a week; then pour it off, heat it to boiling, and pour it over the cucumbers. In 24 hours drain on a cloth, pack in wide-mouth bottles, fill these with strong hot pickling vinegar, and seal at once. Various spices are added in the bottles.

CHINA MOSS.—The curious substance known as China moss has a peculiar constituent called gelose, which has the property of absorbing and solidifying into a colorless and diaphanous jelly, 500 times its weight of water, and is capable of forming 10 times as much jelly by weight as the best animal gelatine.

SAND is worked with cement to keep the latter from cracking, to harden it and to lessen the cost of the mass.

GOOD HEALTH.

Eye-Sight.

Milton's blindness was the result of over-work and dyspepsia.

One of the most eminent American divines having, for some time, been compelled to forego the pleasure of reading, has spent thousands of dollars in value, and lost years of time, in consequence of getting up several hours before day and studying by artificial light. His eyes never got well.

Multitudes of men or women have made their eyes weak for life by too free use of the eye-sight, reading small print and doing fine sewing. In view of these things, it is well to observe the following rules in the use of the eyes:

Avoid all sudden changes between light and darkness.

Never begin to read, or write, or sew for several minutes after coming from darkness to a bright light.

Never read by twilight, or moonlight, or of a very cloudy day.

Never read or sew directly in front of the light, or window, or door.

It is best to have the light fall from above, obliquely over the left shoulder.

Never sleep so that, on the first waking, the eyes shall open on the light of a window.

Too much light creates a glare, and pains and confuses the sight. The moment you are conscious of an effort to distinguish, that moment cease, and take a walk or ride.

As the sky is blue and the earth green, it would seem that the ceiling should be a bluish tinge, and the carpet green, and the walls of some mellow tint.

The moment you are prompted to rub the eyes, that moment cease using them.

If the eyelids are glued together on waking up, do not forcibly open them, but apply the saliva with the fingers—it is the speediest diluent in the world—then wash your face and eyes in warm water.—*Exchange*.

This has been going around for about 10 years, and its ownership, we guess, is lost; but it is good enough to go on indefinitely.

PEDESTRIAN EXERCISE.—In pedestrian exercise for pleasure, sport, or health, much power may be saved by skillfully balancing the spine on the pelvis, and so adjusting and harmonizing the movements of the upper and lower extremities ("getting the swing" as it is called), that the force of gravity does a great part of the work. This is the great secret of the professional pedestrian, whose object is to economize strength, not to expend it. This art is easily acquired, and even a delicate lady, with a week's practice, can cover a distance which at first would seem impossible. But one of the first essentials of true exercise is resistance. There must be some obstacle to overcome, some weight to be lifted, if we would break down muscular tissue and build up with new material. This resistance, a moderate walk will never give. One must needs walk ten or twelve miles a day in order to get exercise enough to keep the body in a healthy condition. To accomplish this task requires from two to three hours. Aside from the benefit to be derived from the inhalation of fresh air, the same amount of exercise may be taken in twenty or thirty minutes by lowering and raising the body, alternately, flexing and extending the legs, by taking a short run, or by making a few excursions to the top of a seven-story building.

RESPIRATION AFFECTED BY FOOD.—A very careful examination by Dr. Speck, of the changes produced in the respiratory process by the use of fatty food, of coffee, quinine, alcohol and water, and by the inspiration of air respectively rich in carbonic acid, poor in oxygen and rich in oxygen, has led him to the following conclusions: With an increased proportion of hydrogen in diet, the amount of air inspired and expired decreases, and nutriment, such as sugar, which contain little hydrogen in comparison with their oxygen, involves more exertion of the respiratory organs than such as are rich in hydrogen like the fats; the more carbon predominates in the food, in proportion to hydrogen, the more air is exhaled in proportion to that inhaled, the more carbon increases in the diet in proportion to hydrogen, the more carbonic acid is evolved and the more oxygen is taken up—while the richer the diet in hydrogen the less oxygen is required. An atmosphere containing 5% or 6% of carbonic acid could be breathed for some minutes without oppression; at 11.51% great exertion would be needed to breathe for one minute; at 7.2 all carbonic acid produced in the body is retained in the blood.

HALLUCINATION OF THE SENSES.—Prof. Maudsley remarks, in a recent lecture, that one striking feature observed by medical men who have had cases of hallucination under their charge is that the patients cannot be convinced that the objects they see, the sounds they hear, and the smells they perceive, have no real existence, and that the sensations they receive are the result of their excited nerves. It frequently happens, too, that a person who suffers from hallucination in respect of one sense has the others unaffected, and is, on all other matters, perfectly normal. Hallucination may arise either from an idea on which the mind has dwelt, appearing as something exterior, or from excitement of the sensory ganglia. It is said that Newton, Hunter, and some others of equal professional eminence, could, at will, picture forms to themselves till they appeared to be realities.

TABLET SALT AN APERIENT.—Physicians have for a long time known that common table salt is an efficient aperient in ordinary cases of constipation. In a lecture on a case of nervous affection, Dr. Weir Mitchell, of Philadelphia, said that he had recommended the patient to take each morning on rising a tumblerful of water—cold, to prevent nausea—in which was dissolved a teaspoonful of table salt. "This simple aperient," the doctor adds, "I frequently employ in cases of constipation, and generally find it efficient. There is great advantage in starting the bowels and in keeping them in a soluble condition, particularly in cases of nervous disorder in women, as it sometimes clears up obscure points in the case, and at all events eliminates one source of error."

DISEASES OF COAL-MINERS.—The Belgian Academy of Medicine has received a report on the researches made by Dr. Fabre regarding the disease to which coal-miners are especially liable. He finds that as coal absorbs rapidly up to 100 times its own volume of oxygen, the air which the miners have to breathe is deprived of oxygen to a hurtful degree. The atmosphere of a mine is also further vitiated by the gaseous carbon compounds given off by the slow combustion of the coal. He concludes that a supply of air is more essential than an empty of light, and that even the best ventilated mines need to be better ventilated.

The Mineral Resources of Washington Territory.

No. 1.

A SERIES OF ARTICLES PREPARED FOR THE MINING AND SCIENTIFIC PRESS BY OUR RESIDENT CORRESPONDENT, ELDRIDGE MORSE.

THE SKAGIT GOLD MINES.

The world knows all about the golden wealth found in the streams and mountains of California. Thousands have penetrated to the most inaccessible parts of British Columbia, and have visited the shores and mountains of far northern Alaska in search of the precious metals; but this is the first season that the general attention of the Pacific coast has been directed to Puget sound as a center of mining enterprise, or to the Cascade mountains in Washington Territory as depositories of mineral wealth in gold and silver, in quantities sufficient to compare with its neighbors to the northward or to the southward. None could give any good reason why these precious metals should not be found in these mountains in quantities as great as they have been produced to the northward and to the southward, in such prolongation of the same system of mountains, except that all previous efforts had to a certain extent been unsuccessful. No large quartz mines had been opened up, and no extensive placers, until recently, been struck.

These things have most undoubtedly produced a tendency to sneer at the possibility of ever finding mines as rich in Washington Territory as have been found in California, Nevada or British Columbia. Still, within the past few years, both placer and quartz mines have been found that promise to equal those in British Columbia and Alaska, and possibly to compare favorably with those of California and Nevada. A wide gold-bearing belt undoubtedly exists, crossing the Territory from north to south, the limits of which may be described in subsequent articles. In this number an attempt will be made to give a concise outline of what is already known in reference to

The Mines on the Skagit River.

Like every other river flowing into Puget sound, fine float gold can be found the whole length of the Skagit. In some places the deposits are rich enough to afford small wages to those who are willing to work them.

In 1860 an Indian woman picked up a nugget of gold near the mouth of the Sauk, some 60 miles up the Skagit, which she sold to the Puget mill company at Port Gamble for \$27.

Ever since that time every little while attention would be called to coarse gold brought from the Skagit by the Indians; but prior to 1878 no specimen of coarse gold had been found by white men on that river or its tributaries; at least no report of such finding has so far been made public. Had anyone found coarse gold, the public by this time would have heard of it.

Prospecting that led to the present excitement began in 1877. From five to seven men were at work during the summer and fall of 1877 prospecting the Skagit and its tributaries, finding in many places good prospects of fine gold on the surface, but failing to discover coarse gold. Prospecting was resumed in February, 1878, when a party went nearly up to what is now called Ruby creek. All but two of the party stopped at the Tunnel canyon, some six miles below the creek. The two who went on—John Rowley and John Sutter—struck coarse gold about two miles up Ruby creek. They found in one pan one dollar and a half. They found so many small rubies in the black sand that they named the stream Ruby creek at that time. Then, prospecting up the Ruby, they struck coarse gold in several places. This stream is about eight miles long, and is formed by the union of two streams, since named Granite and Canyon creeks. These men prospected up both of these, but found prospects only on Canyon. They then prospected on Skagit, above the mouth of the Ruby, and found plenty of fine gold, but no coarse. On returning to the Tunnel canyon, another party was met coming up. In June, 1878, of this second party, Rowley, Conn, Duncan and Presentine went up the Skagit, ten miles above the mouth of the Ruby, and failed in trying to cross the mountain into Ruby and the head of Canyon creeks; then they came down to the mouth of Ruby and went up that stream. They panned out some \$15 worth of coarse gold near its mouth. They also found coarse gold up Ruby and Canyon creeks, but were compelled to return for provisions. A freshet came on while their supplies were near the head of canoe navigation, some 16 or 18 miles below Ruby. The freshet had carried off their canoe, leaving them on one side and their supplies on the other, and the river was too high to attempt crossing, and they had to travel nearly three days without food. In September, 1878, Rowley and Presentine were on Ruby again. They found bare bedrock on Canyon creek, and in one day took out \$20.

Having no provisions, tools, etc., they struck out for supplies, and met Sanger, Woods, and Armstrong at the Tunnel House, and again went up Canyon creek, where, in two hours,

the five took out some \$45. They obtained some \$68 in all that day. In November, 1878, Messrs. Rowley, Armstrong, Woods, Pierce, and Cassy went in and wintered on Ruby. Cold weather and deep snow prevented them from accomplishing anything to speak of. But in February, 1879, they organized Ruby mining district. Representation day was fixed at July 1, 1879, on which day there were 29 men there; but high water, lack of tools, and other difficulties prevented them from accomplishing anything for a couple of months, and so discouraged the men that half of them were about leaving in disgust. On the last Saturday in August, 1879, several of the party were encamped about two miles below the head of Ruby, having left Canyon creek, on their way out. One of them, Berney McCort, took his pan and crossed the creek. In 20 minutes he took out some two dollars. Five others soon joined him, and that evening they took out \$22. These six men stopped there and formed the Nip and Tuck company, which took out nearly \$800, in six weeks. Then one or two of the company stopped after the rest left for this season, and took out enough more, so it is estimated, to make \$1,000 secured by that company of six men last fall.

Rowley and Presentine, with four others, tried for two months, unsuccessfully, to work the Discovery claim, on Canyon creek. They left about the 1st of September, 1879. When going out they met Sanger and Duncan, and gave them authority to clean up their cut, etc. Armstrong joined them. The three cleaned up \$283 from the abandoned cut and bedrock in a few weeks. In not over six weeks, during last September and October, some \$3,000 was taken out by these three miners. Perhaps as much as \$4,000 in all was taken out last fall. About 60 men in all visited the mines that season; but not over 25 did any work to speak of. The gold taken out last fall was what created the great excitement last winter, and caused the rush to that locality over the snow, until, at the present time, some 1,200 men have visited the mines, over one-half of which number have taken up claims. What the present outlook is will be best understood by

A Brief Description of the Skagit River

And that section of country. This river is about 175 miles long. It rises in British Columbia, not far from the Frazer. One of its tributaries rises within 14 miles of Fort Hope. About 10 miles north of the line the west fork joins it; then for 30 miles the stream flows nearly south to the mouth of Ruby, and except for the jams, the river is navigable for canoe all this distance. For this distance the river bottoms are three miles wide, with timber, climate, etc., like those found on the eastern slope of the Cascade mountains. This is a very peculiar valley, with high mountains each side of it. Mount Baker lies just west of it, 10,000 ft. high; while the main range of the Cascades, from 6,000 to 7,000 ft. high, is just east of it. About half way between the mouth of Ruby and the British line is Lightning creek, which, like Ruby, flows into the Skagit from the east. The tributaries on the west are Eagle creek and Beaver creek. The development of the mines will cause this mountain valley to be settled by hundreds of families, who will grow produce for the mines.

Below the mouth of Ruby the Skagit is a terrible river for some 16 or 18 miles until Goodell's, the head of canoe navigation, is reached. It is but little more than a series of wild-cascades, flowing through a succession of very deep and narrow canyons. One of these, some six miles below Ruby, is called Tunnel canyon.

A Remarkable Canyon.

Here also comes in from the east Thunder creek, through a canyon two miles long and 250 ft. deep, and so narrow on top that a man can almost step across it. The creek is nearly 40 ft. wide. In flowing through this canyon it makes a noise like rolling thunder. Its mouth is near the upper end of Tunnel canyon. Here the river was supposed to flow under ground for nearly a mile, and the first prospectors there described it as an "underground tunnel." From above, below and each side it has that appearance. It is only by going to the edge and looking down two or three hundred ft. into the narrow and deep chasm which yawns beneath you that the mistake is discovered. Ruby also flows into the Skagit through a very narrow canyon. For some six or seven miles below Goodell's, although navigable for canoes, the river is very swift and wild, large boulders in the center of the stream and some bad riffles; then comes the portage, where the boulders are so thick and the fall so great that none but the most skillful can or dare shoot through. In times of high water the waves roll over the boulders from six to 10 ft. high. In very low water the waves may not roll over two or three ft. high, but the boulders are so much thicker on the surface of the water that the dangers are nearly as great. The worst part of this portage is only some 300 yards long, but there are very bad riffles just below the main portage. It was in these riffles six men were drowned on the second of May, 1880. Canoes and hats usually are taken through this place with a line, while the freight is all packed around it. In going down only a small portion try to shoot through. Then, no matter what is the skill, a mistroke will consign the whole outfit to a watery grave. At the time of the accident above referred to, the passengers walked around the portage, while the two in charge, Dave Ball and an Indian, shot through all right; then above the lower riffles they took in the 10 passengers; the canoe was fit to carry

six; she swamped; Ball was drowned and five passengers with him; the others were saved by a passing boat. Had this canoe a smaller load, or had the passengers walked 300 yards further, all would probably have got down safely.

Below the portage the country grows gradually smoother, the river easier to navigate, and it is but a short distance to where the valleys are wide enough to cultivate. The ranch of the Cascades, of which Mount Baker is the highest peak, may be said to cross the Skagit river at the portage, which is a very narrow canyon, cut across very high mountain through which the river flows.

Portage City.

Three miles below the portage is Portage City, the supposed head of steamboat navigation. Most of the year steamboats of sufficient power can reach here, although none have gone farther than the mouth of the Sauk, 2 miles below. From Portage City there are no real obstacles to canoe navigation but what are surmounted by hard work; the riffles are some of them, swift, but not dangerous to skilful canoe men. The Sauk is the present best agricultural settlements. Here is a beautiful tract of very fertile land, where there is enough vacant to make homes for hundreds of families. Doubtless it will all be occupied before long.

Eight miles below the Sauk, the Bear river flows into it from the north. It drains the southern slopes of Mount Baker. Fourteen miles below Baker are

The Skagit Coal Mines.

The mine is called the Cumbsland, and account of the forging qualities of this coal, at its resemblance to the celebrated Cumbsland coal. Some seven or eight miles above the mines, the fertile low lands of the Skagit are 10 miles wide, with only a few settlers on the river bank. It is about 16 miles from the coal mine to Sterling, which is quite a logging center and 10 miles from there to Mount Vernon, which is 12 miles from the sound. Mount Vernon is one of the best known points on the river and the usual stopping place for sound steamer, and where most of the minor start in canoes to go up the river. It is expected that after another steam or ice travel will be sufficient to induce steamers to go regularly as far up as the Sauk, and perhaps to Portage City. The country around the mouth of Skagit is considered the most productive in western Washington.

The Snowfall.

Last winter snow fell the heaviest in the mountains and on the sound ever known since the Hudson Bay Company first were here. The forepart of January, in a single week now fell over four ft. deep at Seattle and other points on the sound. In the open places, near the water, it melted nearly as fast as it came; but in the timber back from the water, and in the mountains, it fell much heavier and did not melt. The 1st of March, 1880, the snow probably averaged 10 ft. deep in the mountains. This deep snow commenced falling about the same time as the rush to Ruby creek began last winter. It caught a large number on their way in, just above Goodells. The soft snow was so deep and snow slides so frequent that the first party who broke the trail were 12 days going some 16 miles. After the trail was well broken, a man would carry 80 lbs. and go in in one or one-half days. The troubles of the first lot discouraged some others, so they concluded to try to come in via Fort Hope. There was a wagon road 14 miles from Fort Hope to where it struck the Skagit, thence seven miles farther down it, and an Indian trail to where the two forks joined (at a place named the Steamboat Landing) at the head of the upper valley. Some 10 miles from the boundary and 30 miles from Ruby. Here they were to come down a foot along the bottoms. There were no stables to a summer pack trail on this route, the terrible snowstorms of the past winter so difficult to overcome that the men who came in that way were from 17 to 42 days on the trip. The average was about 30 days. All went out via Goodells and down to Skagit. Some 50 or 60 came in via Fort Hope.

The water in the Skagit river is highest in early summer and lowest in winter. On the tributary streams in the mountains, melting of the snow makes high water often times until late in summer, and low water during the fall and winter.

Ruby Creek

Is about 40 ft. wide, swift and with many boulders in the channel; three miles it runs through a canyon so narrow it can be worked only by fluming. At extreme low water it contains about 7,000 miner's inches of water, flowing under one-ft. head. A flume made so the claim there could be worked eight months out of the year, would have to be large enough to carry some four times that amount of water. Winter is the best time to work most of the claims, on Ruby creek, if they are only first opened in the fall.

Canyon and Granite Creeks

Are each nearly one-half the size of Ruby. The past season gold was first discovered in Granite creek, of quality and in quantities sufficient to induce men to take it up. There is very little float gold on Granite. Canyon creeks some 15 miles long. Its chief tributaries are Mill, State and Gatten's creeks. All Ruby is supposed to be taken, 10 miles Canyon, about 8 of Granite, State and Mill creeks, while a number on Gatten's, Cedar and other small creeks, are also claimed. Near the mouth of Ruby, in several places, gold simi to that in the bed of the creeks has been found in the

mountains several hundred feet above the bed of the creek. Something over \$100 has been washed with snow water there this spring. About \$200 has been also taken out near the mouth of the creek this spring with pan and rocks.

There is a separate mining district for Ruby, Canyon and Granite creeks. Besides these three, another district called Enreka district exists, embracing Lightning creek and its tributaries, where excellent prospects are supposed to have been found on one of its branches, formerly called Three Fools' creek, but now named Eureka creek. Some 40 claims are taken in that district.

About 70 claims are taken on Thunder creek, where is also another district.

This is a very wild and exceedingly rough country, in the most inaccessible part of the Cascade mountains. The gold is similar to Caribou gold in quantity, quality and location; it is quite coarse, but thus far no nuggets above eight dollars in value have been found. No gold to speak of, besides float gold, has been found except on or near bedrock. This has been reached in but few places, and wherever reached the pay has been well distributed and abundant. In Feb., 1878, no snow was on Ruby creek. In the winter following, snow was not at any one time over three or four ft. deep. Last winter set at fault all previous calculations. Men could have worked most all of Ruby, had they had grub and tools in, and claims opened out last fall, all of last winter, despite this high snow; but in the smaller creeks, where the canyons are narrower, the avalanches have filled the canyons from bank to bank with snow from 20 to 150, if not to 200 ft. deep. In many places it has brought down masses of timber, rocks and earth that will be very difficult of removal. The writer traveled for several days over streams that were hidden from sight by snow drifted in, or carried by avalanches, so that for miles at a time the stream would be invisible. There are some of these small streams that poor men could work profitably, if it were not for these avalanches. As it is, about one dozen companies will be almost certain to make money this year; others will make expenses, and others, a greater number, will make little or nothing. With but few exceptions, so far as discover these are not poor men's mines. There is doubtless, plenty of gold on the bedrock will well pay to get it out; but it requires talent and experience to handle it. The chief evil of these mines to poor men will be that of claims to strong companies, and who may make working for wages for the companies two or three years from now, as mines are well opened. It will probably term of years to wash them out. They will do well if they finish prospecting in good pack trails, and a few take that will fairly represent the mines. But little gold can be found before August. A trail for pack put in from Fort Hope, and etc., will probably put in an ent foot trail from Good cross from Granite creek stream flows into the Portage City. It goes over the trail to it from the east, and is a bigable

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The Week.

Notwithstanding the cool and bracing summer weather, and the general good health of the city, several cases of smallpox have been detected in the Chinese quarter, which is, unfortunately, in the central part of early San Francisco. As soon as the presence of the disease was detected—for the Chinese neglect or refuse to voluntarily give the information of its existence among them—the usual precaution of vaccination was resorted to by many residents in the vicinity of the infected quarter. Since its discovery, the Board of Health has been active, and the fumigation and cleansing of the Chinese quarter has been carried on systematically. There is no apprehension that the disease will become epidemic.

The Territory of Alaska presents a condition that is neither creditable to the government nor assuring to our enterprising citizens who have engaged in venture there. The latest attempt to arouse the attention of the authorities comes from Mr. Walter Blaine, a son of the Senator, who again points out the oft-repeated fact that the Territory is really without any government, and urges that a simple and cheap one ought to be provided. At least the common law of the country ought to be extended over the Territory, and proper judicial officers appointed to administer it. Anything would be preferable to a condition of active or latent anarchy.

Next week the Fifteenth Industrial Exhibition of the Mechanics' Institute will commence at the Pavilion. It gives promises in all its excellent features of being the most attractive exhibition of the material wealth of the State which has occurred in this city for years. The premium list is unusually liberal, and ought to excite, as it doubtless will, a spirited and interesting rivalry.

Since our last issue there has been an important development of good ore in the workings connecting the Sierra Nevada and Union Con., and the news has done much to revive the share market. Equally good news has been received from Bodie, where ore has been discovered at the greatest depth yet reached in any mine in the district. These assuring reports from two important districts have had a marked effect in restoring confidence.

The Industrial Exhibition.

The Fifteenth Industrial Exhibition of the Mechanics' Institute will undoubtedly be the notable incident in the affairs of our city and State during the year. It will disclose the condition of our material wealth, of our industrial progress, of our advance in art and taste, and will, in a large degree, mark our social and political standing. The soil of California is as varied and as fertile as her area is extensive, and the use which her people have made of her boundless natural resources will be spread open at the coming fair like the leaves of a book. This industrial exhibition will be a fair and comprehensive exponent of the manner in which our fields and vineyards and gardens are cultivated; it will reveal the methods of our workshop, and show the scope and spirit of our invention no less than the skill and cunning of our manipulation; and it will disclose the measure and the quality of our taste in art and all aesthetic culture. In fine, the exhibition of our varied handicraft will be a revelation of the very body and spirit of the State, and it will enable the observant critic to mete the full measure of our deserts as a civilized community.

So far as the action of the managers of the Institute is concerned nothing appears to be left undone to make this exhibition the marked success of the series. They have invited co-operation not only from the citizens of California but from the entire coast; they have offered a munificent premium list, which is unrivaled in scope and quality; and it would appear that the Institute must achieve the brilliant success which its managers have taken such pains to command.

A conspicuous feature of the exhibition will be the fine horticultural display. It will be the fullest, the most complete collection of herbs and plants which has been exhibited in this State for many years, and will convey some adequate idea of the floral grandeur of our California. In order that this department shall be properly provided and cared for, the managers of the exhibition have arranged with the State Horticultural Society to take special charge of it, and to render it a fair exposition of the horticultural capabilities of our State. Judge will be appointed with special reference to their fitness for examining the articles submitted to them; and the premiums will be awarded upon the recommendation of such committees as the society may appoint. This arrangement ought to insure full satisfaction to the exhibitors.

The State Vinicultural Society will also have a special department adjoining that of the Horticultural Society. It is left to the exhibitors to determine the rules of this exhibition. An interesting feature of this department will be the trial room, where on certain days the wines exhibited may be tried by experts, and as full reports of each exhibit will be made and printed in the proceedings of the Institute, these trials will be of substantial advantage to every exhibitor of the product of the vineyard.

The display of manufactures and inventions will be a prominent feature, and the interest in the skill of our artisans and inventors will be lively and general. It is promised that the exhibition of mining machinery shall be the most complete in variety and extent which has been seen in this city for a number of years; and as mining and milling apparatus is a marked specialty of California, this department will command special and critical attention. Mining machinery is a unique feature of California skill. Nowhere else is the field so large or the expert workman so numerous. For upwards of a quarter of a century, men, already skilled in the fabrication of general machinery, have had a special training in the manufacture of machinery and apparatus for the most varied and stupendous mining operations in the world. As a consequence our machine shops are full of experts, and are under the control of the best equipped engineers. In the production of mining machinery California is easily first and unrivaled.

In addition to those large and distinctive features, the exhibition will comprise the endless details of a variety of ordinary and curious industries, an examination of which will not fail to give pleasure and instruction. The man of affairs, whether he be manufacturer or artist, farmer or inventor, will not miss the material for thought and profit in the collected products of the State; while our young men and women, our boys and girls, will find no better school in which to learn to observe the methods of civilized life; to perceive, and in some measure understand, the nature of the industrial arts by which communities promote their comfort and happiness. The lessons learned by them may prove strong incentives to exertion and purpose, and finally lead to useful and honorable careers.

A RUMORED ENTERPRISE.—It is rumored at Grantville, Nye county, Nev., says the *Austin Reveille*, that a company of capitalists has arranged for sinking a shaft 1,000 ft. in depth on a series of locations recently made, adjoining the Alameda, in the mountain west of the town of Grantville. The enterprise is in the hands of men who have had large experience on the Comstock, and if carried out as reported means mining in a scientific manner.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held Monday, August 2nd, with Dr. Hermann Behr in the chair. The donations to the museum comprised, among many valuable gifts, a large and beautifully-mounted collection of butterflies, from Mrs. J. H. Sargent; a *Raia stellulata*, from Prof. David S. Jordan; a *Telephonium*, or big bug of Mexico, from Vice-President Justin P. Moore, and a large piece of American graphite, or plumbago, weighing several hundred pounds, from the graphite mines at Ticonderoga, N. Y. Several large volumes of astronomical records were received from Cambridge observatory, Harvard college, etc.

Mr. Volmar A. Hoffmeyer was elected a member of the academy.

Dr. Kellogg, the eminent botanist of the coast, read a description of a new and exceedingly beautiful large violet-blue Gentian found by Mr. G. W. Dunn in June last in the mountains east of San Diego, specimens of which are here exhibited, having flowers one and a half inches across; a very dark purple eye or center, with, as it were, a brush-dashed border, fading into blue. The plant grows to a height of about three ft., and may readily prove of marked ornamental interest to florists, and an agreeable addition to gardens.

Besides being valuable medicine. The plant being a new one to science and unnamed in the catalogue of California botany, he took occasion to name it *Gentiana Dunnii*.

Dr. Kellogg then exhibited flowering specimens of a most remarkable harberry tree from Big canyon—the *Barberis Fremontii*—which grows 20 ft. high, and its trunk is three inches in diameter. It was laden with golden glooms, and may be cultivated and made one of the most desirable ornamental shrubs of California. It thrives well on poor, dry, rocky soils, and is celebrated for its medicinal virtues. Its sap furnishes material for making a most powerful yellow dye.

He also presented an unexplained fibrous plant from Lower California, which shoots up a flowering stem 5 or 6 ft. high, and bears an ample mass of small white glooms. He thought it of the Colchicum family of plants, all the varieties of which are valuable remedies, useful in cases of gout and rheumatism. It is good for purposes of thatching, for which it has been used. He proposed to test and study it up, and report its general commercial use at a future meeting. He also exhibited a plant of the *comandra umbellata*, belonging to the family of sandal-wood trees, which has been found in the Sierra Nevada foothills. It bears a delicious nut which squirrels eat with great relish.

Mr. C. D. Gibbs then read a carefully-prepared paper on the

Uses of Graphite, or Plumbago.

Which, he said, was erroneously called black lead. He alluded to the term used in commerce, of "lead-pencils," which he pronounced a total misnomer, because there is never any lead in them. They are all made of graphite, a wholly different substance, which has the same geological parentage or general form of classification as our anthracite coal. It is used to make pencils, crucibles, and portable furnaces; also for lubricating machinery, and giving a stove-polish to iron. He described the manufacture of pencils by the Dixon or American Graphite Company, who now employ 80,000 pencils daily, or over one-quarter of all the pencils used in America, and also the famous Borrowdale mine in Cumberland, England, which was formerly kept closed all but during six weeks of every year, when the quantity taken out was monopolized and sold for several hundred thousand dollars. The most famous mine in now the Aliberti mine, in Siberia, which furnished graphite commanding the highest price in commerce. The paper was a very interesting one, and was offered in illustration of the beautifully foliated specimen presented last evening to the academy.

One of the members reported that several Alameda oystermen, having read the discussion about the King crab, presented at the last meeting, had reported to him that they had, on several occasions, found young ones among Eastern oysters on their arrival, and that no possible doubt could exist that they were introduced on our coast by being brought overland with shipments of young Eastern oysters.

Dr. Henry Gibbon, Sr., made some remarks explanatory of technical Latin names used in botany, after which the academy adjourned.

FLOATING DOWN A FLUME.—Recently on a Sunday evening, says the *Carson Appeal*, a number of ladies and gentlemen, visitors at Glenbrook, went to the summit at the head of the large flume. After witnessing the rapid flow of the water and great quantities of wood in it, one of the party suggested that none present dared take a trip down the flume. An offer of a wager was made and accepted by Wither Harlow and Miss Belle Graham, both of San Francisco. The two foolhardy young folks jumped upon a pile or raft of wood and rapidly floated down the flume for a distance of a mile or more, when a sudden lurch caused them to lose their equilibrium, and they were thrown faces foremost among the wildly tossed wood. A half mile from the place of disaster they were fished out by a couple of flume watchmen, badly bruised and cut up, but otherwise unhurt.

The Mining School at Berkeley.

Whatever is done by the State for the advancement of the mining interests of this coast must be of interest to the readers of this paper. The last Legislature appropriated a few thousand dollars for the equipment of the mining school of the State University at Berkeley. That the investment is a good one for the community will be evident from the following account of the manner in which a portion of the funds is being expended.

The value of a superior mining school to our mining interests can not be overestimated. When the graduates of such an institution become scattered over the mining regions, promoting our mountains and working our mines, cultivated intelligence will take the place of the ignorance and empiricism which too often control at the present time. Such a body of educated engineers, co-operating with the specialists in charge of our mining school, will certainly exercise a powerful influence towards the adoption of the most rational and economical methods in all of our mining operations.

There are three more or less distinct branches to the mining profession, viz: experting, mining engineering, and mill engineering. The expert determines the nature, form, and value of the ore as it lies in the ground, oftentimes before any developments whatever have been made. On this work special knowledge in mineralogy and geology is required. The mining engineer determines the most economical methods of getting the ore to the surface; this demands special training in mathematics, mechanics, and the peculiar methods of tunneling, mining, surveying, etc. The mill engineer determines the best methods for freeing the ore from its gangue and combinations in order that it may be made useful in the arts; they require special knowledge in physics, chemistry, and metallurgy. These three functions sometimes are and sometimes are not exercised by the same individual. In the old countries the differentiation has become very decided; on this coast it is becoming more and more so every year.

This triple subdivision of the profession leads to a similar one in the educational work. Three distinct and more or less independent courses of study are recognized, in each of which the studies indicated above claim, respectively, pre-eminence; and that student only who has successfully completed these three lines of study, can claim to be fully conversant with the subject of mining in all of its details, at least so far as study alone can make him so.

All three of these courses are being developed in the Mining School as rapidly as the resources of the institution will permit, but it is to the course of mineralogy and geology that we wish to refer more particularly in the present article. Up to the present time, owing to lack of needed facilities, instruction has been given only in mineralogy and general geology. Courses of lectures are now to be added on petrography (treating especially of rocks as contrasted with minerals) and on economic geology (treating especially of ore, etc.), together with the necessary laboratory work in both branches. Opportunities for study and investigation in this course in the Mining School will hereafter be very complete.

The whole upper floor of the South Hall is being furnished and equipped for the work of this department. The large hall, 75 ft. by 25 ft., will contain the museums of mineralogy, petrography and economic geology. Handsome and commodious black walnut cases are being constructed for the extensive collections which have remained unpacked and inaccessible for so many years. The new cases are of the best design and are so arranged that both the systematic and the exhibition collections are combined in the same case, thus preserving the unity of the whole. Ample space is provided for all the material of the different museums now on hand, including the collections of the State Geological Survey, as well as for that which is continually being sent from all parts of the coast.

The Museum of Mineralogy, while specially rich in California minerals, contains likewise specimens from every quarter of the globe. The collection as a whole is arranged after Breithaupt's system, the specimens of each species of mineral being sub-arranged geographically. The exact geographical distribution of each mineral can thus be determined at a glance. When the collection is more complete this will develop many interesting relations concerning the laws of the distribution of gold, silver, copper, etc.

The Museum of Petrography will be arranged after the same general plan. When the work is completed a detailed description of all of the rocks of the State will be published. From the immense amount of labor involved in the preparation and study under the microscope of thin sections from so many hundreds of rock specimens, the work necessarily progresses slowly. When finished, a classification of the building materials and other rocks of economic use will be made, which will be of great practical value.

The Museum of Historical Geology will contain specimens of rocks, carefully arranged, to illustrate the geological structure of the earth's crust. Each sedimentary rock will be accompanied by its appropriate fossils, and the relation of igneous to sedimentary rocks will be carefully brought out. The possession of the

Geological Survey material renders it possible to illustrate the geological structure of California in great detail.

The Museum of Economic Geology will exhibit, by a full suite of specimens from each mine, the exact nature of the ore-deposits upon the Pacific coast. From each deposit will be displayed a specimen of each of the different ore minerals, of the veinstone, of the contact of ore and veinstone, of the selvage or gouge, of the country rock from foot-wall and hanging-wall, and of the contact of vein and country rock. In addition, specimens illustrating any other important geological feature of the deposit will be included—such as a change in the country rock, either in dip or strike, the intersection of two veins, "horsts," etc. The collection will not be confined to deposits of precious and base metals alone; all deposits of economic value, such as peat, coal, asphaltum, oil, sulphur, salt, gypsum, limestone, clays, etc., will be similarly represented.

In response to circulars which have been widely distributed over the coast, the material for this collection is continually coming in from the mines, and when completed it will be made the basis of an extensive series of investigations into the geographical and geological relations of the ore deposits of the coast, with a view of determining the laws of their occurrence and formation. The specimens will also be used for illustrating the course of lectures on economic geology, the students thus coming in direct contact and acquiring perfect familiarity with the identical ores which they will be called upon later to work.

We shall regard this collection, when complete, as by far the most valuable one, for this coast, in existence. It will be a complete record of the mining resources of the country; and the fact that it is the property of the State and is managed by competent scientific men ensures its permanence and its integrity. We wish it might be felt the duty as well as the pride of every mine owner on the coast to have his mine fully represented in this collection.

These museums are always open to the public, and an attendant is always present to conduct visitors through them. On the opposite side of the main hall are the mineralogical and petrographical laboratories, the museum work room, the instructor's private laboratory and the instructor's study.

The mineralogical laboratory contains a large collection of unlabeled minerals which the students determine by their physical properties. By this process of determination a knife, a lens and a small piece of biscuit porcelain, are the only implements required, together with the general knowledge of minerals which has already been acquired during the previous year's course. Students thus learn to determine all of the common ore, and rock-forming minerals at sight, and all except the rarer minerals, with the use of the above-mentioned instruments, such as can be carried easily in the vest pocket.

In the petrographical laboratory is to be placed for determination by the students a large collection of unlabeled rocks. The distinctly granular or macrocrystalline and macroclastic rocks will be determined by the ordinary processes of physical examination, while the compact or cryptocrystalline and cryptoclastic rocks will be investigated by the preparation of thin sections and subsequent study under the microscope. Every facility for the grinding and mounting of thin rock sections will be accessible to the student at all times. The instructor's private laboratory will be furnished with every facility for wet analyses, fusions, etc., a complete blowpipe outfit, a lapidary's lathe, with diamond saw for cutting and grinding thin rock and crystal sections, and mounting table for microscopic work.

Next to the laboratory is the private study, containing the instructor's special library and cases for the fine physical instruments used in the investigations of minerals and rocks. The renowned firms of Hartnack and Fuess in Berlin will furnish the optical apparatus. The equipment will contain microscopes specially constructed for mineralogical investigation; a very fine goniometer reading to 10 seconds, for the measurement of crystal angles, both at ordinary and at elevated temperatures; a polariscope for investigations in polarized light, determinations of indices of refraction in crystals, angle of optical axes, etc.; a spectroscope, with a battery of prisms of great delicacy; and one of Bunge's new short-arm chemical balances of great accuracy. Here will likewise be kept the large collection of mineral and rock sections used by the instructor for the illustration of his lectures in mineralogy and petrography.

It will thus be seen that this department of the State Mining School has become enabled, through the wise liberality of the last Legislature, to offer to all, "without money and without price," facilities for acquiring most thorough training in every department of mineralogy and geology; and in addition to the regular instruction every opportunity is presented, both to regular students and to qualified special students, for the independent investigation of any topic connected with either of these branches.

We cannot close this short sketch without noticing the generous liberality of Wells, Fargo & Co. in forwarding from any point on their lines, free of charge, material for the museums of the University. On account of the great expense of sending such heavy material over long distances, the growth of the collections would be materially retarded were it not for their kindness in this respect.

The Winged Phylloxera.

J. S. Hyde, of Santa Rosa, writes to the *Rural Press* that a few days since, while examining some grape-vine roots infested with the phylloxera, he remarked to some friends present that there was little danger from the rapid spread of this pest, as the insect, in its winged form, had not yet appeared. The words had scarcely passed from his lips ere one of the gentlemen cried out: "I see one with wings now!" On a more careful examination eight full-winged specimens were found; the next day four other specimens were discovered. Several of these insects were sent to Dr. Hilgard of the State University for examination.

The above announcement by Dr. Hyde is very interesting, and not the less so from the fact that the insects he sent to Prof. Hilgard, although truly a winged-form, were sterile, and

FIG. 1.



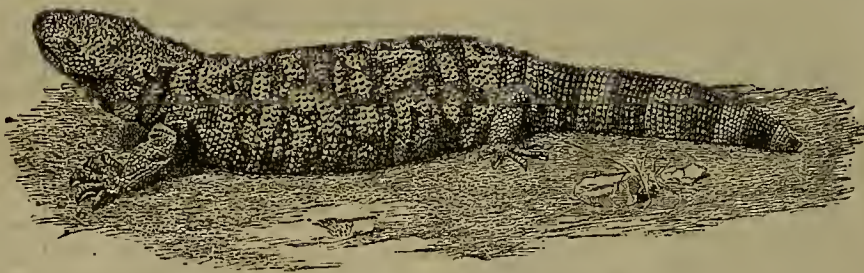
FIG. 2.



FERTILE AND INFERTILE FORMS OF WINGED PHYLLOXERA.

not capable of spreading the destruction which our vine-growers fear. In order to show the difference between the fertile and infertile winged forms, we have reproduced engravings from Prof. Riley's drawings of the phylloxera, which show clearly the distinction between the two. Fig. 1 is the fertile-winged female, which thus far has not been observed in this State, unless some of the insects retained by Dr. Hyde are of this form. Fig. 2 shows the outline of each of the five specimens received by Prof. Hilgard. It will be observed that in the fertile-winged female the abdomen is prolonged and that the body is about half as long as the whole insect wings included, and is of a tapering, rounded form. In the sterile, the body is rarely one-third the length of the whole, and the abdomen is abruptly contracted, as shown in the engraving. It would have been

tund form. It is 19 inches long, 9 inches around the body, has a thick tail like a kangaroo, and weighs two pounds. Its color is yellow, with clearly defined black scales one-eighth of an inch in diameter, resembling the marking of a butterfly. This peculiar appearance is said to be the model which the Aztecs followed in making their pottery. The Mexicans also have decorations after the same pattern, and the Indians of this coast certainly follow it in their basket-work. This specimen is very seldom seen and is known to be the rear guard of the past race of prodigious fauna represented by *dinosaurius*, *megatherium*, *pterodactyle*, etc. It is slow-motioned, cannot overtake its prey, and is consequently easily devoured by its enemies; hence, its liability to become extinct, which enhances the value of the few specimens in existence. The Indians regard the reptile as a great deli-

THE AZTEC LIZARD (*Heloderma suspectum*) FROM ARIZONA.

better if the engravings had shown the front view of each insect, but the different forms of the abdomen can still be clearly seen.

Concerning the finding of the sterile-winged form by Dr. Hyde, Prof. Hilgard spoke at the meeting of the Horticultural Society as follows: "After all the matter still rests pretty much as we conjectured it was two years ago. I then stated that either the winged phylloxera was not here at all, or in very small numbers. There are live or six varieties of the insect non-winged, which live on the roots, which produce a winged form towards autumn, which, like the wingless form, is simply a female which lays eggs without any connection on the part of the male. The winged female is simply an egg-layer, like the others. She lays a few eggs only. Some of these eggs produce males and others females. It seems to be necessary that there should be a kind of renovation of the race in that way. The winged insect is dangerous, of course, because it is capable of flying to some extent. In Europe the winged form has served to carry the insect a distance of 30 or 40 miles at one jump, leaving districts between unaffected. In Sonoma the progress of the pest has been slow, and it has been thought that the winged insect was absent. The winged forms produce only two varieties—one fertile, the other infertile. I understand that in other countries the proportion of infertile ones is small and that of fertile ones large. Of the eight sent me by Dr. Hyde, I find that five are of the infertile kind. I infer, therefore, from the evidence thus far produced, that the spread of the pest will still be comparatively slow, de-

pending upon the kinds that crawl instead of those that fly."

The announcement by Dr. Hyde will doubtless induce a still wider search for the winged insect. We shall be pleased to receive any specimens which may come to the eyes of our readers to determine their exact standing.

The Aztec Lizard.

Prof. J. G. Lemmon, the well-known botanist and naturalist, brought with him from his last visit to Arizona a living specimen of a rare reptile, called the Gila monster or Aztec lizard (*Heloderma suspectum*). The engraving on this page gives a good idea of the animal. The engraving is from a photograph by Williams & Samuels, cor. 11th and Clay Sts. Oakland.

The specimen is a female and is believed to contain many eggs, which would account for its ro-

Letters from the Comstock.—No. 6.

EDITORS PRESS:—There has just been concluded in Carson a suit in the U. S. Circuit Court, wherein the old Wells-Fargo mining company were conducting an action against the new Wells-Fargo company, verdict for the defendants. The history of this suit is as follows: About two years ago the Wells-Fargo was owned by a company headed by one Pearson, a character quite well known on Pine St. The principal business of the company consisted in levying and collecting assessments. What they ever did with the money is more than your correspondent can say. After being raked in from the public it became absorbed in some mysterious manner. Perhaps Pearson got some of the benefits of the same, and perhaps some of the Trustees; but how any one of the Trustees could have gotten any of it when Pearson was in sight is a grand mystery.

Presently people got tired of paying assessments for Wells-Fargo stock, and the delinquent lists got to be pretty long. One of them was advertised in the *Virginia Chronicle*, per order of Pearson, and the bill sent to him. No attention, however, was paid to this, and D. E. McCarthy, proprietor of the *Chronicle*, finally got his dander up and went for Wells-Fargo like a terrier for a rat. The first thing the Pearson crowd knew was that the mine was sold at Sheriff's sale to satisfy a claim of a few hundred dollars, and it was bid in by an agent of McCarthy. Everything was done decently and in order, in a legal sense; but the Pearson crowd, knowing that the mine had passed from their hands, kept right on levying assessments and collecting when they could. They brought a suit to recover the property and were beaten; they carried it from court to court, and although worsted at every turn, kept right on dragging their net up and down the street and getting what they could. The newspapers exposed the swindle and showed that there was no such thing as a Wells-Fargo Co. headed by Pearson and his gang; but the Board allowed the stock to remain on the list, and every day people who had no means of knowing the exact state of affairs were suffered to purchase for hard coin stock not worth the paper it was printed on. Now the last decision of the courts dispossesses Pearson of all the claims he made for the mine; but whether or not the Board will still allow the old Wells-Fargo stock to be sold through its official cognizance remains to be seen.

Pearson has been a sort of ulcer in the body mineral for years, and he never yet touched a piece of mining property that he did not hight it with crookedness and chicanery. There are scores of just such men in mining circles, and until they are unceremoniously thrust out the public will have precious little faith in mining.

Just now the bears are using every lever to depreciate north end stocks. The wires are loaded down with accounts of porphyry, barren ledges and failures to find ore. A careful reading of these dispatches shows exactly where the nigger in the fence is. Portions of the mine are spoken of as failures where no one ever expected to find any ore, and really truthful information is twisted into meaning a thousand things which have a bearish tendency upon the market. Besides this, brokers are pressing their customers for "mud," and the screws are being put on in every available way to help the depression. People can take these signs as they see fit. There is some object in it all, and those who let go at such a time will have themselves to blame. As for the mines themselves, there is nothing to be said of them now, which might not have been equally true a week ago. HAND DRILL.

MEETING OF MINING ENGINEERS.—We have received from Prof. Thomas M. Drown, Secretary of the American Institute of Mining Engineers, a circular announcement of the preliminary arrangements for the Lake Superior meeting of the members. The arrangements promise a large degree of pleasure to the engineers and their families. As for example: a steamboat will meet the party at Marquette, on which the members and ladies accompanying them will live during their stay in the Lake Superior region, and on which excursions will be made to various points on the lake, including the copper districts, Thunder Bay, Silver Islet, and, by the way of Sault St. Marie and the Straits of Mackinaw, into Lake Michigan. Further details respecting the route from New York, place of entertainment in Chicago, rate of fare, subsistence in the lake regions, etc., will be given in a subsequent circular. A postal card is sent with the first circular, on which those members who propose to attend the meeting are requested to fill the blanks and return the card to the Secretary as early as possible. Punctual attention to this request is necessary to the comfort of all concerned. The time fixed for the party to leave Chicago for Marquette is August 23d.

THE SOUTH AFRICAN DIAMOND FIELDS.—Advices received from Port Elizabeth state that the value of the diamonds exported from the South African diamond fields last year was \$3,685,610, as compared with \$3,084,711 in 1878.

"PASSED OVER."—Frank S. Weeks, a practical printer and writer, died of consumption, in this city, July 25th. Mr. Weeks came from Troy, N. Y., to California at the age of 18, and commenced his avocations as printer and contributor on the *Mt. Messenger* in La Porte, Sierra county, in 1862. Having pursued an honorable course, he has left many friends.

THE national debt decreased \$5,576,053 during July.

The Mechanics' Institute Fair.

The approaching fair of the Mechanics' Institute, which will be opened in the pavilion on the 10th inst., promises to be unusually interesting and attractive. The exhibitions of the Institute have always been characterized by a large and generous spirit, as shown in the systematic efforts to promote and advance the skill, taste, industry and products of the State; but it would seem to be the determination of the managers in the coming fair to surpass all their previous achievements. For this purpose they have earnestly invited the co-operation not only of all those in California who feel an interest in the advancement of its varied industries and products, but as well of the people of the entire coast. We do not doubt that the request will receive an efficient and liberal response; for apart from the palpable advantages that will follow a generous exhibition of the multifarious industries of the coast, the munificent offer of premiums in gold, silver and bronze medals, in diplomas, and in very hard cash, will be an additional and strong incentive. The list of premiums is so large and so valuable that we think it well worth the while to call special attention to it. Here are the details of the ample list: Cash premiums, 62; medals—gold, 40; silver, 313; bronze, 215; diplomas, 92. These handsome prizes will bear the super-scription of the Institute—the highest industrial authority in the State—and are worthy of a keen and generous competition. As awards of merit for some desired quality or valued excellence, they will give substantial character to the possessor; and besides the profit which they will bring directly or indirectly, they will be a lasting source of satisfaction and pride.

DIVISION 1.

MANUFACTURED PRODUCTS: MACHINERY.

CLASS NO. 1.—Steam Engines, Boilers and Appliances.

GOLD MEDAL.—For best Automatic Cut-off Steam Engine, not less than 15 horse-power.

SILVER MEDALS.—Best Portable Engine, mounted on wheels, for farm and general use; Straw-burning Engine; Vertical Boiler and Engine, Combined; Upright Engine (small); Horizontal Engine and Boiler Combined; Steam Boiler made in Cal.

BRONZE MEDALS.—Best Traction or Road Engine; Steam Engine (working model); Steam Engine Governor; Boiler Injector; Oil Engine; Gas Engine.

DIPLOMAS.—Best Low Water Indicator for Steam Boilers; Safety Valve for Steam Boilers; Tallow Lubricator for Steam Cylinders; Piston Packing; Best and Most Improved Grate Bar.

CLASS NO. 2.—Hydraulic Machinery and Steam Pumps.

GOLD MEDAL.—Best Steam Pump, direct and double acting.

SILVER MEDALS.—Best Water Elevator, by the Direct Action of Steam; Double Acting Lift and Force Pump for general purposes; Hydraulic Engine; Centrifugal Pump; Hydraulic Motor for Light Machinery; Hydraulic Lift; Hydraulic Lifting Jack; Turbine Water Wheel.

DIPLOMA.—Best Hydraulic Ram.

CLASS NO. 3.—Machinists' Tools and Metal-working Machinery.

SILVER MEDALS.—Best General Display of Articles in this Class; Iron Planer, in motion; Power Blower; Hand Belows; Power Punch.

BRONZE MEDALS.—Best Power Shearer and Punching Machine; Engine, Lathe; Shaping Machine; Turners for Furnaces or Forges; Milling Machine; Bolt and Screw Cutter; Power Hammer; Drilling Machine; Emery Wheel Machine; Taper Setter.

DIPLOMAS.—Best Portable Forge; Drop Press; Display of Machinists' Small Tools; Vices; Ratelut Drill; Shaft Coupling.

CLASS 4.—Wood-Working Machinery.

GOLD MEDAL.—Best General Display of Saws.

SILVER MEDALS.—Best General Display of Wood-working Machinery; Surface and Matching Machine, to plane not less than 24 inches wide; Portable Saw-Mill; Shingle Machine; Lathe for Irregular Forms, in operation; Dope-tailing Machine; Box Nailing Machine; Circular Saw with inserted teeth, Lathe Machine.

BRONZE MEDALS.—Best Band Saw for Lumber; Band Saw for Scroll Work; Reciprocating Saw for Scroll Work; Carving Machine; General Wood-working Machine; Molding Machine for Straight Molding; Molding Machine for Ornamental Moldings; Circular saw and Table Complete; Wood Lathe; Foot Lathe for General Purposes; Slide Lathe for Taper or Other Forms; General Display of Cutters for Wood-working Machinery; Saw Gunner.

DIPLOMAS.—Best Molding Machine; Sand-Papering Machine; Trenching Machine; Miter Sawing Machine; Foot Power Scroll Saw (in operation).

CLASS NO. 5.—Printing and Miscellaneous Machinery.

GOLD MEDAL.—Best display of Boot and Shoe Machinery.

SILVER MEDALS.—Best display of Printing Machinery; Type Gasting Machine; Paper Rolling Machine; Display of Stereotype Plates and Work; Windmill; Ice Machine; Gas Machine; Brick Machine.

BRONZE MEDALS.—Best Power Printing Press; Foot Printing Press; Paper Folding Machine; Pulley Blocks; Hand Printing Press; Lifting Jack, other than Hydraulic; Carpet Beater.

DIPLOMAS.—Best Tobacco Cutter; Meat Chopper, (power).

CLASS NO. 6.—Mining Machinery and Appliances.

GOLD MEDAL.—Best General Display of Mining Machinery.

SILVER MEDALS.—Best Stone Breaker and Ore Crusher; Rock Drill (actual test); Air Compressor; Quartz Mill; Amalgamating Pan (running); Concentrator (in operation); Quick Silver Furnace; Furnace for Roasting Ores; Apparatus for Transporting Ores; Perforated Quartz Screens.

BRONZE MEDALS.—Best Ore Feeder; Dump Car or Bucket; Hydraulic Nozzle and Joint.

CLASS NO. 7.—Laundry Machinery.

SILVER MEDAL.—Best Washing Machine.

BRONZE MEDALS.—Best Mangle; Wringer; Centrifugal Clothes Dryer.

DIPLOMAS.—Best Wash Boiler; Crimping Machine.

CLASS NO. 8.—Fire Apparatus and Appliances.

GOLD MEDAL.—Best Steam Fire Engine (actual test).

SILVER MEDALS.—Best Carbonic Gas Engine; Hook and Ladder Truck; Hose Carriage or Truck; Fire Escape.

BRONZE MEDALS.—Best Carbonic Gas Extinguisher.

DIPLOMAS.—Best Hydrant; Hose Coupling.

CLASS NO. 9.—Marine.

SILVER MEDALS.—Best Driving Armor and Appliances; Life Boat; Outrigger Shell Boat (Wood); Outrigger Shell Boat (Rau).

BRONZE MEDALS.—Best Life Preserver; Life Saving Raft; Model of a Sailing Vessel; Model of a Schooner; Captain's Ship's Windlass; Propellers.

DIPLOMA.—Best Disengaging Apparatus for Life Boats.

CLASS NO. 10.—Sewing Machines, Knitting Machines, Braiding Machines, and Looms.

GOLD MEDALS.—Best Over-Seam Sewing Machine; Sewing Machine for Manufacturing Purposes; Sewing Machine for Domestic Work.

SILVER MEDALS.—Best Loom for Weaving Carpet (in operation); Loom for Weaving Silk Cloth (in operation); Loom for Weaving Silk Ribbons (in operation); Loom for Weaving Woolen (in operation); Loom for Weaving Wire Cloth; Button-hole Machine.

BRONZE MEDALS.—Best Silk Weaving Machine (in operation); Family Knitting Machine; Braiding Machine.

CLASS NO. 11.—Agricultural Machinery.

GOLD MEDAL.—Best General Display of Agricultural Machinery.

SILVER MEDALS.—Best Reaper and Mower, with Self Raker, Self Binding, Grain Harvester; Thresher and Separator; Portable Hay Press; Fruit Dryer; Machine for Digging or Excavating; Steam Plow.

BRONZE MEDALS.—Best Reaper; Mower; Lawn Mower; Broadcast Seeder; Riding Cultivator; Sulky Hay Rake; Harrow; Str Plow; Gang Plow; Side Hill Plow; Plow for General Purposes; Horse Power; Cider Mill; Portable Mill for Grinding Grain; Hay and Straw Cutter; Stump Extractor; Artesian Well Boring Tools; Bag Holder; Burr Mill Stones; Seed Drill.

DIPLOMAS.—Best Assortment of Mower and Reaper Knives; Mower Knife Sharpener; Walking Cultivator; Corn Planter; Potato Digger; Fence for General Use; Bee Hive; Post Hole Digger.

DIVISION 2.

MANUFACTURED PRODUCTS: METALS.

CLASS NO. 12.—Iron, Steel and Lead.

GOLD MEDALS.—Best general display of Iron and Steel; Lead and its Manufactures; Wire and Wire Rope; Car and Carriage Springs.

SILVER MEDALS.—Best general display of Bolts and Nuts; Assortment of Wire Ornamental Goods; Assortment of Castings; Metal Signs; Embossed Signs; Work; Chains and Chain Work; Display of File Cutting, California make; Mattress Springs.

BRONZE MEDALS.—Best general display of Wrought Iron Pipe and Boiler Tubing; Horse Shoes, malleable Iron and Steel; Axes.

DIPLOMAS.—Best general display of Rivets; Cut Nails.

CLASS NO. 13.—Cooking, Heating and Ventilating.

(By request of exhibitors in this class no premiums offered for these articles): Best Hot Water; French Portable Family Range; Parlor or Office Stove.

SILVER MEDALS.—Best Cooking and Heating Apparatus; Coal Oil Cooking and Heating Apparatus; Best display of Tin Ware; Copper Ware; Janned Ware; Planished Ware.

BRONZE MEDAL.—Best Steam Heating Apparatus.

DIPLOMA.—Best Flat-Iron Heater.

CLASS NO. 14.—General Hardware.

GOLD MEDAL.—Best display of general Hardware.

SILVER MEDALS.—Best assortment of Fire-Arms; best Fire Arm, California make.

BRONZE MEDALS.—Best display of Bronze Hardware; best assortment of Fishing Tackle; Harness Ornaments; best Set of Carriage Tools; Metal Signs; Embossed Signs.

DIPLOMA.—Best Rubber Printing Wheel.

CLASS NO. 15.—Fire and Burglar Proof Safes and Locks.

GOLD MEDAL.—Best Fire and Burglar-proof Safe.

SILVER MEDAL.—Best Burglar-proof Lock; best assortment of Locks, California make.

CLASS NO. 16.—Cutlery and Edge Tools.

GOLD MEDAL.—Best display of general Cutlery.

SILVER MEDALS.—Best Carving Set; assortment of Edge Tools, California make.

CLASS NO. 17.—Grates and Mantels—Marbles, Artificial Stone, Earthenware, Glassware, Etc.

GOLD MEDAL.—Best display of Glass Ware (Cal. make).

SILVER MEDALS.—Best display of Marble Mantels; Marbleized Iron Mantels; best Single Stove; Marble Mantel; best assortment of Terra Cotta Ware; best Sewer and Drain Pipe; Ornamental Chimney Tops; best display of Cut Glass, Porcelain and Fancy Ware; Monumental Work.

BRONZE MEDALS.—Best display of Marbleized Slate Mantels; best Fire Orates; best specimen Artificial stone; Polished Granite; best Buckingham and Yellow Ware.

DIPLOMAS.—Best specimen of Fire Brick, not less than 10; Pressed Brick, not less than 20.

CLASS NO. 18.—Brass Work—Gas and Lamp Fixtures—Plumbers' Goods, etc.

GOLD MEDAL.—Best assortment of Brass Work.

SILVER MEDALS.—Best assortment of Belis; best display of Gas Fittings; best Decorative Single Work; best Galvanized Iron Work; Copper Work; best sample Galvanizing (done here); Electro-plating (done here); best Water Closet; Sewer Trap.

BRONZE MEDALS.—Best display of Plumbers' Goods; best assortment of Steam Fittings; best display of lamps; best Zinc Ornamental work; best Water Filter.

DIVISION 3.

MANUFACTURED PRODUCTS: WOOD OR WOOD AND IRON.

CLASS NO. 19.—Carpenters', Joiners', Carvers' and Stair Builders' Work—Ornamental Glass, Painting, etc.

GOLD MEDALS.—Best general display of Stained, Ground and Best Glass for Architectural Work; best Plate-glass Mirror (imported in California).

SILVER MEDALS.—Best specimen of Stair Building; best Newell Post, and not less than six Balusters; best specimen of Cut and Embossed Glass; best Wood Graining; Mirror or Picture Frame, design and workmanship; best Parquet Partouts; Wooden Mantel, style and finish.

BRONZE MEDALS.—Best Carving in Wood for Building Purposes; best assortment of Church Furniture; set of Inlaid and painted section of Car; best Double-hung Window; best assortment of Picture Frame Moldings; best display of Articles made from California Woods; Fancy Brackets and Ornaments; Composition Ornaments; best display of Turned Articles from California Woods; Weather Strips for Doors and Windows.

DIPLOMAS.—Best specimen of Scroll Sawing; Ornamental moldings; best Parquet Flooring, not less than 9x9.

CLASS NO. 20.—Musical Instruments.

GOLD MEDAL.—Best general display of Musical Instruments.

SILVER MEDALS.—Best Brass and Silver Wind Instruments; Stringed or Reed Instruments made in California; best display of Music Boxes.

CLASS NO. 21.—Vehicles and their Attachments—Children's Carriages, Hobby Horses, Etc.

GOLD MEDAL.—Best general display of Carriages.

SILVER MEDALS.—Best Horse Car; Hotel Coach; best Double Buggy; Single Top Buggy; Open Buggy; best Stage Coach, all Cal. make; best Platform Spring Double Wagon; Platform Spring Single Wagon; best Buggy Wheel; best Street Buggy; Car; best Double-hung Window; best Cart; Butcher's Cart; best display of Carriage Goods and Hardware; specimen of Carriage Blacksmithing; Bicycle.

BRONZE MEDALS.—Best Sulky, Cal. make; Farm Wagon; Wagon Wheel; best Child's Carriage; Hobby Horse; best Swing in operation.

CLASS NO. 22.—Furniture, Upholstery, etc.

GOLD MEDAL.—Best general display of Furniture.

SILVER MEDALS.—Best set of Parlor Furniture; Dining Room Furniture; Bedroom Furniture; Library Furniture; Office Furniture; best Extension Lounge or Sofa Bed; assortment of Chairs; best School Furniture; Office Desk; best specimen of upholstering; display of Chocolate, Cocoa and Shaded and Fictitious; Curtains, Cornices and Trimmings.

BRONZE MEDALS.—Best Easy Chair; Barber Chairs; best Spring Mattress; Metal Spring Bed Bottom; Slat Spring Bed Bottom.

CLASS NO. 23.—Billiard Tables.

GOLD MEDAL.—Best display of Billiard Tables, style and finish.

SILVER MEDALS.—Best Billiard Table; Billiard Tables, parlor use.

BRONZE MEDALS.—Best Billiard Table Cushions; Balls, Cues and Racks.

CLASS NO. 24.—Wooden Ware, Brushes, Wire Goods, Willow Ware, etc.

GOLD MEDAL.—Best display of Willowware.

SILVER MEDALS.—Best display of Willowware; Wire Goods; Brushes; Feather Dusters and Plumes; best display of Cooperage; California Manufactured Brooms.

BRONZE MEDALS.—Best assortment of Baskets; best assortment of Boxes, Butter Packages, etc.; display of House Furnishing Goods.

DIVISION 4.

MANUFACTURED PRODUCTS: ANIMAL AND VEGETABLE FABRICS.

CLASS NO. 25.—Boots, Shoes, Leather, Rubber Goods, etc.

GOLD MEDALS.—Best general display of Boots and Shoes (Cal. make); best general display of Harness and Saddlery.

SILVER MEDALS.—Best Ladies' and Misses' Hand-made shoes; Men's Hand-made Boots and Shoes; Machine-made Boots and Shoes; best Sole Leather; Fair Leather; Kid Leather; Morocco Leather; Calf Skins; Rawhide Goods; best Leather Hose, 100 feet, all Cal. make; best display of Rubber Goods; best assortment of Laid Cal. make; best Set of Harness; Saddle and Bridle; best display of Trunks and Traveling Equipage.

BRONZE MEDALS.—Best Leather Belting; Cotton or Linen Hose, not less than 100 feet; best display of Whips; Horse Collar; best Trunk for Traveling.

CLASS NO. 26.—Hemp Cordage, Paper, Furs, Hair, etc.

GOLD MEDALS.—Best general display of Cordage, Cal. manufacture; best general display of Paper, Cal. manufacture.

SILVER MEDALS.—Best Bale of Hemp, raised in Cal.; Bale of Imitation Silk, raised in Cal.; sample Ramie Fiber (dressed), not less than 20 lbs.; sample California Cotton, 20 lbs.; best display of Furs; display of Woods of this Coast; best Goat or Sheepskin Mats.

BRONZE MEDALS.—Best Bale of Excelsior; specimen Curled Hair; best general display of Paper Boxes; best display of Carriage Robes; samples of Furs Cleaned or Colored.

DIPLOMA.—Best general display of Paper Bags.

CLASS NO. 27.—Woolen Dress Goods Carpets, Cotton, etc.

GOLD MEDAL.—General display of Woolen Goods (Home manufactured).

SILVER MEDALS.—Best specimen of Cal. manufactured Dress Silk (25 yards); Ribbons (10 varieties); best samples of Cal. manufacture; best display of Carpet; best display of Silk Thread and Twist; Knit Goods (all Cal. make); best All Wool Cassimeres; Blankets; best All Flannel; best display of Carpets; Rag Carpets, style and quality; Mats and Matting (Cal. make); Oil Cloth, Cal. manufacture; Weaver of any kind; best display of Articles manufactured in the building from any of the above goods; Tents Awnings and Camp Equipage.

CLASS NO. 28.—Gentlemen's Furnishing Goods, etc.

SILVER MEDAL.—Best display of Gentlemen's Shirts, style and workmanship, Cal. manufacture; best display of Gent's Furnishing Goods; Dress Suit for Gents; Umbrellas and Parasols; best display of Gent's Hats and Caps; Gloves, Goat or Buckskin, (Cal. make) Gloves, Kid.

BRONZE MEDAL.—Best Business Suit for Gents; best display of Boy's Clothing; Military Goods; Regalia; Masquerade Costumes and Masks.

CLASS NO. 29.—Ladies' Furnishing Goods, Dresses, Cloaks, Millinery, etc.

SILVER MEDAL.—Best Ladies' Dress Suits (style and finish); best display of Ladies' Corsets (Cal. make); best display of Millinery and Straw Goods; of artificial Flowers; East India Goods, Shawls, etc.; Buttons and Fringes (Cal. make); Specimen of Work done at the Pavilion on any sewing Machine during the Exhibition.

BRONZE MEDALS.—Best Ladies' Walking Suits (style and finish); best display of Ladies' Corsets; best display of Underwear; display of Laces and Embroideries; Bonnet, style and workmanship; Ostrich Feathers, Plumes, etc.

DIPLOMA.—Skirt or Stocking Supporter.

DIVISION 5.

CHEMICAL AND NATURAL PRODUCTS.

CLASS NO. 30.—Tobacco.

SILVER MEDAL.—Best display of Tobacco, Leaf or manufactured; California manufactured Cigars, not less than 1,000.

BRONZE MEDAL.—California manufactured Cigarritos 6 varieties; Fine Cut Tobacco (Chewing); Fine Cut Tobacco (Smoking), all Cal. make.

CLASS NO. 31.—Chemical and Pharmaceutical Products.

GOLD MEDAL.—Best display and general assortment of Soap; assortment of Varieties and Artistic Materials of California manufacture; display of Paints, California manufacture.

SILVER MEDAL.—Best general display of chemical and Pharmaceutical Preparations; best assortment of Tinctures; best assortment of Compounds; best display of Candies (California make); Acids (California manufacture); best Flavoring Extracts and Essences; Gums (California make); Starch; Yeast or Baking Powder; Shoe Blacking (California manufacture); best display of Wines, Brandy and Ales (Cal. make); display of Matches, quality and variety (Cal. make); prepared Paints for general use; Printing Inks.

BRONZE MEDAL.—Best assortment of Staple Soaps; best display of Disinfectants and Antiseptics; best Flavoring Syrups; Lubricant; Yeast Preparations; best Soda Water Generating Apparatus.

DIPLOMA.—Best Natural Medicinal Water; best Soda Water Draught Apparatus; Soda Water Bottling Apparatus.

CLASS NO. 32.—Geology, Mineralogy, Zoology, Botany, etc.

GOLD MEDAL.—Best Mineralogical display; for the largest and most comprehensive Collection of the Natural Products of the Pacific Coast.

SILVER MEDAL.—Best display of Coals of the Pacific Coast; Salt, Rock and Ground; best collection of Ores and Crystals (Scientific); collection of Stuffed and Preserved Animals; Shells and Preserved Native Woods; Belles and Curiosities, gathered in any part of the World, of not less than 200 specimens; best display of Petroleum, Crude and refined, of California.

BRONZE MEDAL.—Best collection of Shells; Dried Flowers, showing their natural forms.

DIPLOMA.—Best collections of Insects and Oozocous; Fossils of this Coast.

DIVISION 6.

FOOD PRODUCTS.

CLASS NO. 33.—Groceries, Meats, Flower, etc.

SILVER MEDAL.—Best display of California Cured Hams, Bacon and Lard; California Refined Sugars; California Butter and Cheese; best assortment of Crackers and Cakes; assortment and quality of Canned Fruits, Meats and Vegetables; Jellies, Jams and Preserves; best general display of confectionery; display of Chocolate, Cocoa and Syrup; Wheat Flour; best Corn Meal; Buckwheat Flour; best assortment of Pickles and Sauces; best Fine and Fancy Candies; display of Canned Fruits, home made; collection of Jellies, home made.

DIPLOMA.—Best Lard Candies.

DIVISION 7.

LIBERAL AND DECORATIVE ARTS.

CLASS NO. 34.—Wines.

Best general display of California Wines; Sparkling Wine; Still Wine; Dry White Wine; Sweet Wine; Port Wine; Claret Wine; Older Wine.

CLASS NO. 35.—Liquors and Fermented Products.

SILVER MEDAL.—Best Brandy (Cal. Grape) Bitters; Ale; Lager Beer.

BRONZE MEDAL.—Best Whisky.

DIVISION 8.

FINE ARTS.

CLASS NO. 41.—Paintings in Oil and Water Colors.

One thousand dollars in cash will be awarded in this Class for the most meritorious Exhibits by our Local Artists. The classification of the awards not yet determined upon.

CLASS NO. 42.—Ceramic Art.

SILVER MEDALS.—Best Collection of Specimens of Ceramic Art; Specimen of Painting on Pottery by a Local Amateur (not less than 12 pieces); Specimen of Painting on Porcelain by a Local Amateur (12 pieces); Specimen of Pottery; Single Specimen of Painting on Porcelain; Collection of Decorative Art in Oil or Water Colors (other than Ceramic); Display of Encaustic Tiles.

BRONZE MEDALS.—Second Best Collection of Specimens of Ceramic Art; Specimen of Painting on Pottery by a Local Amateur (not less than 12 pieces); Second Best Painting on Porcelain by a Local Amateur (12 pieces); Second Best Single Specimen of Painting on Pottery; Second Best Single Specimen of Painting on Porcelain; Second Best Collection of Decorative Art in Oil or Water Colors (other than Ceramic).

CLASS NO. 43.—Sculpture, Statuary and Carving.

SILVER MEDALS.—Best Display of Marble Statuary; Display of Plaster Statuary; Specimen of Marble Statuary; Specimen of Modeling in Plaster; Seal Engraving; Wood Carving; Display of Ivory Goods; Display of Amber and Meerschmum Goods.

CLASS NO. 44.—Engravings, Original Drawings, Penmanship, Etc.

SILVER MEDALS.—Best Specimen of Wood Engraving (done here); Specimen of Lithographic Design; Original Pen Drawing; Original Crayon Drawing; Original Architectural Drawing; Original Pen Drawing; Specimen of Penmanship; Drawing, Strictly Perspective; Original Mechanical Drawing by an Apprentice; Mechanical Drawing by a Pupil of the Public Schools; Architectural Drawing by an Apprentice; Architectural Drawing by a Pupil of the Public Schools.

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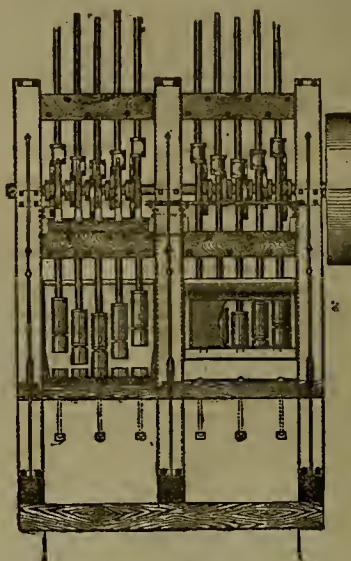
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING JULY 27TH, 1880.

230,526.—RAIL JOINT FOR BED FRAMES.—W. B. Cantrell, Yreka, Cal.

230,413.—UNITING THE TWO HALVES OF CYLINDERS.—W. T. Carratt, S. F.

230,556.—EYE-SHADE.—W. Lancaster, Santa Rosa, Cal.

230,557.—REIN HOLDER.—A. Lay, Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

The Peck, Stow & Wilcox Co. vs. Lindsay Sterritt & Co.

U. S. Circuit Court, Western District of Pennsylvania. Decided, November term, 1879; Acheson, J.:

1. The first claim in Reissued Letters Patent, No. 8,866, granted August 19, 1879, to the plaintiffs, as assignees of Amos Shepard, is valid.

2. The decision of the Patent Office upon the question of priority of invention will be binding upon a party and his privies where it appears that such party has filed in the Patent Office an application which had been placed in interference with the application of the original patent upon the reissue of which suit is brought, and had received and acquiesced in an adverse judgment of priority of invention, and had disclaimed the invention at issue in the interference which is also that involved in the suit for infringement, and had taken out a more limited patent.

3. Such decision cannot bar the defense of prior invention by others; but the action of the Office in granting the patent and the *prima facie* case made thereby, should have great weight where the matters set up in such defense were known to the party under whose patent the defendants claim title at the time of making his application, and that a claim was made by him notwithstanding the invention for the infringement of which suit is brought.

Strobridge vs. Lindsay, Sterritt & Co.

U. S. Circuit Court, Western District of Pennsylvania. Decided, May term, 1879; Acheson, J.:

1. The first claim of Reissued Letter Patents, No. 7,583, granted to Turner Strobridge, March 27, 1877, for an improvement in coffee-mills, is valid.

2. The mere fact that the device of the defendants has a function additional to that accomplished by the patented invention will not justify the defendants in the use of the latter without liability.

3. Letters Patent, themselves *prima facie*, establish the fact that the patent of the inventor is established thereby, and strongly confirmatory of this will be evidence tending to show the favorable acceptance by the public of the improvement and its recognition by the trade as something new and meritorious.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

REIN-HOLDER.—Anson Lay, Oakland, Cal. Patented, July 27, 1880. No. 230,557. Many different devices have been arranged for holding reins when the drivers of vehicles were absent. Among them are several clamps fixed to the dash-boards by rivets, bolts or otherwise, and intended as fixtures. In connecting them holes have necessarily to be formed in the dash-board. If they are moved from one place to another the holes remain and give an unsightly appearance to the dash. Some of the devices are furnished with spring clamps, these springs being attached to the holder by bolts or rivets and liable to be broken off. This present invention is intended to overcome these objections, as it may be secured in any place without bolts or rivets, and be moved from one side to the other at will. It consists in forming or stamping in one piece a rein-holder, spring and clamp, said clamp being made elastic so as to be secured to the dash-board or any desired point without the use of bolts or rivets or the necessity of perforating the dash-board.

POCKET MAPS.—We have received from Rand, McNally & Co., Chicago, copies of two pocket maps—one being a new sectional map of the State of Colorado, and the other a map of the "Dolores mines," situated in Pioneer district, Ouray county, Col. The latter map was compiled from actual surveys by J. F. Wannemaker, United States Deputy Surveyor, and William Munroe, Civil and Mining Engineer, Silverton, Col. The map of the State of Colorado is so indexed that every railroad, town, county, lake or river can be readily found. Both maps are well executed and substantially covered.

DITCHING AND DREDGING MACHINE.—John A. Murray, Stockton, Cal. Patented July 20, 1880. No. 230,329. This device consists in certain details of construction by means of which mud or earth is removed from the ditch and deposited at a distance therefrom, the operation being continuous. It also consists in providing buckets or scoops, having peculiarly arranged bottoms, which open and close automatically at the proper time, so as to drop the loads freely and rapidly.

ORE FEEDER FOR CRUSHING MILLS.—Joseph O. Mortz, S. F. Patented July 13, 1880. No. 229,903. This feeder consists in providing a cylinder or conveyor, in which is a piston or plunger, placed below a hopper, and so connected with an operating lever and weight or spring that the action of the stamp and operating lever will cause a reciprocating motion of the plunger, which will feed the ore forward to the battery by a direct action, in combination with a spring check-bar, by which lumps or masses of ore are retained and prevented from falling suddenly into the battery.

VALUE OF THE CARP FOR FOOD.—Some four years ago Prof. Baird engaged in the work of introducing in this country the best varieties of European food fish. A number of young carp, of the varieties known as the "leather carp" and the "minor carp," were imported, and in 1878 120 of these fish were removed to the Government carp ponds at the national capital, constructed especially for the purpose on the Washington monument reservation. The ponds cover about 12 acres, and the carp have multiplied to such an extent that it is possible now to begin the work of distributing them. The introduction and domestication of the new food fish will be of much interest and importance to all inland communities, as there is not a ditch, mill-dam or any hoggy, muddy spot which can not be converted into a pond in which they will thrive. The carps soon become tame and can be readily handled, and it is thought that in a few years they can be made as common an article of food as ducks or pigeons. Prof. Baird says that each of the female carp taken out of the pond will furnish from 250,000 to 1,000,000 of eggs, and by the artificial system of propagation, which insures the fertilization of all the eggs, 90% of them will be hatched.

A HANDBOOK OF SOUTHERN IDAHO.—A map of southern Idaho and adjacent regions, by Judge W. F. Anderson, of Bonanza City, accompanied by a fresh and interesting compilation of the most trustworthy data relating to the material resources of the Territory, by Charles Drayton Gibbs, M. E., has been laid upon our table by the publisher, Warren Holt, 717 Montgomery St. Judge Anderson's map is the result of a painstaking sifting and use of the most authentic materials in existence, and it will doubtless prove a trustworthy guide to the rich mining regions of southern Idaho. The compilation by Mr. Gibbs is chiefly derived from the local papers, from Judge Anderson, and from Prof. Hayden's geological survey of the Territories, and will be of especial value to the immigrant, the miner, and the capitalist. A careful reading of the little book will leave the impression that the phrase, "Gem of this Mountain," was fitly applied to that delightful and tssaming Territory.

WOMEN AS SANITARIANS.—In the course of his recent address at the Smith College commencement, President Gilman remarked: "That education must be secured through good living, obedience to the laws of health and recreation. The housewife should be educated so as to be able to prevent the ailments of those who dwell under the same roof with her. As every young man must expect to qualify himself to support a household, so must every young woman strive to render herself fit to manage the affairs of the house. The relations to each other of all the things which effect good living must be understood—food, air, water, exercise, etc.—in order that all emergencies may be provided for. All those things which we call modern improvements—gas, water-service furnaces, books, newspapers, magazines, and other manifold accessories of the household—must result in bad odors, noxious gases, headaches, and a host of other ills, unless their right use is understood and insisted on by the ever-watchful housewife. All sanitary reforms must rest on the shoulders of the women of the country."

GOOD NEWS FROM BODIE.—We learn that a mill has been started to crush ore from the Belvidere mine. This will be the first ore yet reduced from that property. There is also the good news of a co-operative effort on the part of the Bodie Con. and the Mono companies who have joined to sink a new and spacious shaft of three compartments. Better still, is the important news that ore has been discovered in the 600 level of the Jupiter. This is the greatest depth yet reached and in which ore has been found in any mine in Bodie, and the discovery is, of course, hailed as a good indication. Depth will certainly put Bodie in good form.

BRAKES ON ENGLISH RAILWAYS.—British railway seem to have made even less progress in the adoption of continuous train brakes than our own, says the *Railway Gazette*, in spite of parliamentary requirements. It appears that only 25% of the engine and 28% of the passenger train carriages are fitted with any of the systems returned by the companies as continuous brakes, and that many of the brakes so returned failed to comply with the conditions laid down by the board of trade. In this country brakes filling all these requirements are in use on the passenger trains of nearly all important roads, and earnest effort is being devoted to perfecting a continuous brake for freight trains.

The Lost Mines of Canma.

A late dispatch from New York says: Major Crossman has telegraphed from Panama, on his return from the "Lost Mines of Canma." The investigation does not appear to have been favorable.

A gentleman now on the Comstock once spent some time in search of those or some other lost mines in that region. He was so far successful that he found in this jungle an ancient road paved with stone. Trees three feet in diameter were in many places found growing in the center of this road, and the jungle was so thick and so tangled with vines, that in tracing the road it was necessary to cut a trail with machettes.

In this manner the old road was traced for many miles till it at last came to the edge of a great swamp. On the border of the morass it was squarely broken off. No sign of a road could be found in the swamp, but it was thought that its disappearance in such a place was of little moment. Our explorer was sure he would find the continuation of the road at this base of the mountains on the opposite side of this swamp, but nothing more of it was ever seen, though many days were spent in searching for it.

According to native tradition the road led to a ruined town where there were mines immensely rich in gold. On the seacoast were ruins of a town, and it was from these that the great paved road led out into the wilderness. In the forks of a tree, some 60 ft. from the ground, near the ruins of the town on the seashore, were seen about a wheelbarrow of bricks. The supposition was that these bricks had been brought to the place as ballast by some ship. The tree had grown up through a pile of them, carrying upward as it grew those seen in its forks.

At intervals along the road were found the ruins of what appeared to have been wayside stations. The low stone walls still stood, but no sign of roof or wood work of any kind remained, and great trees frequently grew within the enclosures, and in some places had overthrown one or more of the walls. In digging for relics on the floors of some of these old guard-houses fragments of charcoal or charred wood were found, but nothing in the way of tools, pottery or anything else of the least value.—*Territorial Enterprise*.

POPULAR SCIENCE MONTHLY.—The number for August of this sterling monthly of popular science presents a full list of instructive and entertaining paper from disciplined thinkers and writers. The opening paper on "The Ksarney Agitation in California," by Henry George, is a vigorous exposition of some of the present phases in the working of the political and social institutions of the country. The subject is treated with great care and power, and is entitled to an attentive reading. The delightful essay by M. Radau on "The Interior of the Earth," is completed. Prof. Huxley has a paper on "The Method of Zadig," relating to retrospective prophecy, which exhibits the writers characteristic traits. "Geology and History," by Prof. Grant Allen, ranks among the impressive and valuable papers. Two articles on natural history, under the titles of "Types of the Nubian Race," and "The Cinchona Forests of South America," will be found readable. Mr. G. B. Halsted's paper on "Algebras Spaces Sogies," is a remarkable report on the higher sciences; and Miss E. A. Youman's description of Prof. Rains' method of teaching chemistry in public schools, is interesting. There is a pleasant sketch by Prof. Joy of the veteran chemist, Frederick Wohler, whose 80th birthday is to be celebrated next month. Besides these principal papers there are several excellent popular science articles. And the editor's special work in editorials, notices of books and miscellany is fresh and complete. This valuable monthly of popular science is edited by one of the most remarkable men in America; and we cannot do a better service to young men especially than advise them to read it regularly. Its study will elevate their thoughts and help them to reflection, and will gradually lead them to systematic and higher methods. The *Popular Science Monthly* is published by D. Appleton & Co., New York city, at \$5 a year, or 50 cents a copy.

MINES OF SOUTHEASTERN NEVADA.—We learn from the Bodie *Standard-News* that Col. Ellsworth, a resident of that district, had just returned from a trip to Deep Spring valley, and what is sometimes called "Death" valley, in the southeastern part of Inyo county, where he reports an extensive mining region. Those valleys are about 160 miles from Bodie; their altitude is considerable, and the climate temperate. The surrounding hills are mineral-bearing. A conspicuous feature of Deep Spring valley is a mountain of chloride of sodium, containing enough pure salt to supply the continent. Copper ore abounds, and the ores of silver and gold are plentiful. In Deep Spring valley a limestone ridge extends four or five miles, and is apparently a mass of iron ore. A short distance to the eastward is Lida valley, another promising mining district. Two quartz mills are running there; and Col. Ellsworth asserts that the district is rich in various minerals. He believes the region to be an inviting one for the prospector and capitalist.

News in Brief.

THERE are 14 twins in one ward in Nashville, Tenn.

A LONDON lady had \$4,000 worth of flowers at a party.

INDIA'S yield of tea is estimated this year at 70,000,000 pounds.

FORTY-four horses were burned, August 1st, in Whits Sulphur Springs, West Va.

A SCHEME has taken shape for holding an international exhibition in Rome in 1885.

In an encounter in Chicago August 1st, Wm. Mackin fatally shot his brother Michael.

SIR BARTELE FRERE has been removed from Poultry is rapidly fattened for market in France on barley and steamed yellow carrots.

the Governorship of the Cape Town Colony.

FORESTVILLE, Sonoma, has had seven or eight distinct earthquake shocks this week and last.

A PRISONER in the jail in Fremont, O., has been identified as Bender, of infamous notoriety.

THERE has been a general increase in farm wages all over the country during the past year.

VICTORIO's band has been repulsed in an attempt to cross into the United States from Mexico.

At a riot in Victoria, Brazil, on the 28th ult., the troops and police fired on the populace, and killed 20 persons.

A NATURAL cavern, 600 ft. long, and others of less size, have been discovered near Wells, Somerset, England.

THERE is more building now going on in Tucson, A. T., than at any other time in the history of the city.

A TRACT of 50,000 acres on the Northern Pacific railroad has been bought for a colony from Belfast, Ireland.

THE Rumpa rebellion in Hindostan shows no sign of collapse, as the British troops cannot endure the unhealthy climate.

JOHN GIBBONS, a stage-driver, accidentally shot himself through the heart with a revolver at Milton, Calaveras county.

THE chief travel to the top of Vesuvius by the new railway is done by night to see it illuminated by the electric light.

Doc. HAMILTON, a railroad brakeman, was run over by eight cars at Independence, Oregon, July 29th, and instantly killed.

THE German revenue falls below expectations, and the Ministers are trying to invent new means for increasing the taxes.

THE Philadelphia *Times* says that everybody who bathes in Philadelphia water is obliged to take another bath to wash this mud off.

THE Baltimore schooner *George Washington* was searched by officers from a Spanish vessel off the east coast of Cuba on July 6th.

An Eureka, Nev., July 30th, N. A. Chandler, a well-known citizen, shot and killed himself. Financial embarrassment was the cause.

TENNESSEE has established a yellow fever quarantine against New Orleans, and Kentucky, Mississippi and Arkansas may do the same.

JOHN WILLIS, night clerk in a hotel at Helsinki, M. T., was attacked by a desperado and his companion, and was badly cut about the head.

A PARTY of Eureka sportsmen went out on Humboldt bay one day last week and managed to hook 700 rock cod, besides a number of halibut.

In London parasols get larger and larger. In some cases it is said there is no distinction in size between a parasol and the family umbrella.

THE right to hold a City Court in Los Angeles under the Constitution has been raised in the case of a Chinaman tried for violating the license law.

COMMON sense is getting ascendancy in the matter of children's shoes. Fewer little girls are seen with the high heels, which spoil their feet and their gait.

A DAUGHTER of Secretary Thompson, while out riding at Mare Island on July 27th, was thrown from a runaway horse, but fortunately escaped uninjured.

The Gatling gun is said to be surpassed in deadliness by a Swedish invention, which has been adopted by the Prussian navy, and can be carried into the mainport.

Or the 671 artists' models in Paris, 230 are Italiane, 120 French, 80 Germans, 60 Swiss, 49 Belgian, 45 English, 30 American, 3 Austrian, 2 Portuguese and 1 Irish.

In PARIS three francs are given to poor people for each child brought to the dispensary to be vaccinated, in order to induce parents to permit the operation.

A GENTLEMAN in Ulster county was married without knowing it. At least he is claimed by a young lady as her husband, and she shows a certificate confirming her statement.

THE old-fashioned leather fan, which was such a conspicuous feature of a lady's dress in the time of "good Queen Bess," has recently been revived under different names.

A FRENCH gentleman who tried to fast for 30 days, abstaining from all drink as well, died on the 21st of July, no amount of medical skill being adequate to restore his wasted vitality.

THE jury in the *Seawanhaka* case find that the disaster was caused by the bartering or collapse of one of the taps of the starboard boiler, whereby the flames were drawn under the gate-hinge into the fire-room.

FORTY-FIVE freight trains, comprising 1,500 cars, almost all of which were filled with grain, passed south on the Hudson River railroad Saturday, July 31st. It was the heaviest one day's shipment since the road was built.

The Mechanics' Fair Daily.



FAIR OPENS AUGUST 10, 1880.

By authority of the BOARD OF MANAGERS OF THE MECHANICS' INSTITUTE FAIR the publishers of the MINING AND SCIENTIFIC PRESS will issue a large edition of the ELEVENTH VOLUME of the MECHANICS' FAIR DAILY during the FIFTEENTH INDUSTRIAL EXHIBITION, which opens in San Francisco, Tuesday, August 10th, 1880.

It will be of good size, printed and circulated FREE in the Pavilion, and contain the day and evening programme, a list of exhibits, and official bulletin of the Institute.

Its columns will embrace a large variety of important industrial and scientific information, illustrations and well written descriptions of the general features and most deserving and novel exhibits in the Fair, a record of the Fair and incidents of its daily progress—gay, serious and comic—as they occur.

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More than ONE HUNDRED THOUSAND different individuals will read copies of our paper during the Fair. The novel character of the journal—the specially attractive features of its free issue in the Pavilion, and its absorbing interest to visitors at the Fair, the attention its columns command when brought into the shop and family circle by those who receive it freely at the Fair, make the paper a powerful advertising medium.

The Managers have granted us the exclusive advertising and printing privileges, and will receive no advertising in the official catalogue and reports.

Our ten previous volumes have met with unrivaled success and gratifying results to advertisers, nearly all of whom were leading and first-class business firms.

Many thousands of marked copies were sent by mail and otherwise to friends near and distant, giving the FAIR DAILY a more broadcast and universal circulation than any other newspaper published.

Its columns are more closely examined throughout than those of any ordinary publication.

By past experience, ample facilities, and a fair reputation of doing business in our line, we expect, with the reasonable support of all naturally interested in the success of our enterprise, to make the coming volume superior to its predecessors, and eminently satisfactory to the Institute, to our patrons and to the general public, who are more or less benefited by such an advocate of the substantial advancement of the grand and worthy industries of our coast.

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SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and rather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

FRESH attractions are constantly added to Woodward's Gardens, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

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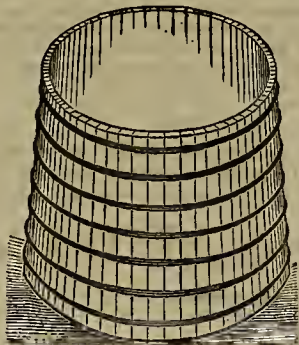
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Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, Room 37, S. F., July 15, 1880.

At a meeting of the Board of Directors of the above named Company held this day, Dividend (No. 50) of Fifty cents (50c.) per share was declared, payable on TUESDAY, July 20, 1880. Transfer books closed until Wednesday, 21st.

W. W. TRAYLOR, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,

SAN FRANCISCO, AUGUST 24, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 18, of Seventy-Five Cents (75c.) per share was declared, payable on THURSDAY, August 12, 1880, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York. WM. WILLIS, Secretary.

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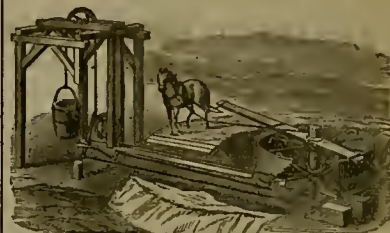
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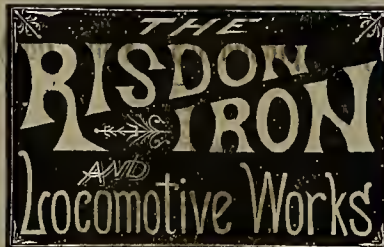
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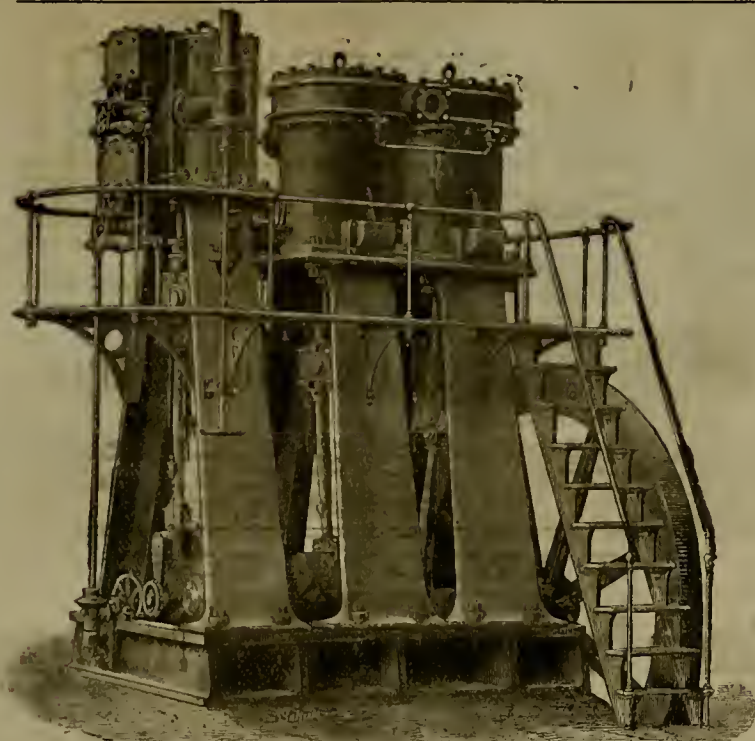
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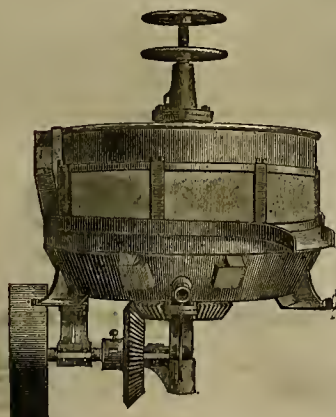
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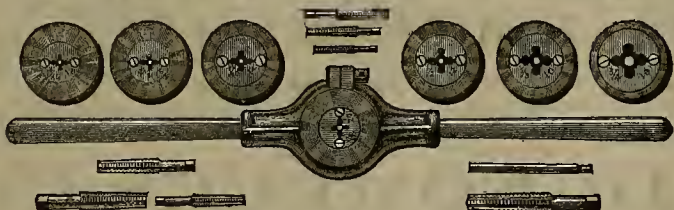
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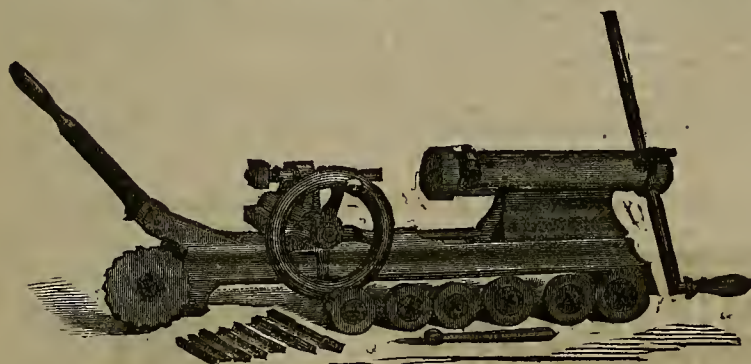
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What is it? Everybody knows it is as essential to life as food itself. Yet when people are ill for the very want of revitalization through respiration, they dose themselves with drugs and bitters to the effect of demoralization! All Invalids should read **Drs. STARKEY & PALEN'S (Phila.) Treatise on Oxygen**, which is sent free to all who may ask for it. The subject is worthy of investigation. References to physicians in San Francisco, who use and prescribe Compound Oxygen in practice. As prepared for home use (conveniently sent to any address) it may be obtained of H. E. MATHEWS, 606 Montgomery street, S. F., upon the same terms as furnished by Drs. Starkey & Palen, Philadelphia, Penn. Complete instructions with each package.

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SAN FRANCISCO, SATURDAY, AUGUST 14, 1880.

VOLUME XLII
Number 7.

Training of Apprentices.

The address delivered by President Cornwall at the opening of the Industrial Exhibition, held under the auspices of the Mechanic's Institute, is entitled to the most serious consideration. After giving a brief history of the beginning and growth of the Mechanics' Institute in this city, the details of which are especially interesting, Mr. Cornwall said: "Among other things now in contemplation by the patrons and friends of the Institute, to increase its usefulness, is the establishment of an apprentice's department, where regular and frequent meetings of apprentices may be had for the purpose of investigation and debate upon mechanical and other subjects, and the institution of a system of lectures and classes for technical education, where skilled workmen and learned teachers may explain the methods by which the hard things of life are made easy, the confused clear, and the doubtful certain. By these and kindred means, the increasing thousands of idle youth growing up in this city, many of whom, because of idleness, are drifting into vicious ways, may be diverted into channels of intelligent mechanical industry, and grow into useful and respected citizens, with happy homes, thus adding to the aggregate wealth and prosperity of the country."

This contemplated addition to the Institute is the suggestion of good, practical sense. The want of such a department for apprentices is as clear as the sun at noonday. There is no more important duty than the proper training in some study of physical science of the lads who are to become the artisans of the State. Every fact that the lad acquires, every principal that he understands, will equip him so much the better for his path in life in whatever direction it may lead. He will be immensely better in every respect for the mental discipline which it is proposed to give him. He will become not only a more intelligent and skillful workman, but he is likely also to become a better citizen. The young man to whom "the hard things of life have been made easy, the confused clear, and the doubtful certain," starts out in life with a certain assurance of "getting on." There is hardly one of our trades, except the merely huckstering ones, in which some kind of training in some branch of natural knowledge will not be directly profitable to the pursuer of that occupation. And as our various mechanical and artistic industries reach higher stages of development—as their processes become more complicated and refined, and competition at the same time becomes more keen—science will be invoked to aid the competitors, and the artisan who can best avail himself of her help in producing the most skillful work will come out uppermost in the contest. The advantages which would result from the establishment of such a school of training as that indicated in the address of President Cornwall are too obvious to require mention. Indeed, the wonder grows that an institution of the kind had not been established long ago.

Yet there are some who object to the "apprentices' department" on the ground that there is neither demand nor room for more mechanical labor; that our market is already plethoric and glutted; and finally, that we cannot enter into successful competition with the mechanical products of the manufacturers of the Atlantic seaboard. To these objections it may be answered that, if they are well founded, the very best thing for our manufacturers and artisans to do is to "shut up shop." But, happily, the Institute is animated by a larger faith in the future of this city as a great manufacturing center. For the President's address fully meets the objections. It suggests that the difficulty in the way of our manufacturers may be traced to the want of better methods, to the want of close and systematic economy—

wants which are essential to success in any enterprise. But as things exist the patience, intelligence and skill of San Francisco's mechanics have driven out of the market many wares of Eastern and foreign product. President Cornwall easily shows that the extension of the railroad system which is now progressing will throw open a vast field to the industrial enterprise of this metropolis.

We hope the beneficent suggestion of President Cornwall will be fully carried out, and that it will be in successful form before the next exhibition occurs. It is a happy idea to mend the training of our apprentices. We shall have more skillful because more intelligent mechanics, and the products of our shops will show higher excellence. The proposed school for apprenticed lads is of more importance to the welfare of the people than any radical political measure that could be thought of. There is a system of similar schools for the technical training of young artisans throughout England and parts of Ireland, and, as we learn from high authority, the effects are palpable, large and good.

DEPOSITS OF CHALCEDONY.—Extensive deposits of a variety of chalcedony have been discovered in the hills at the head of Huasna creek,

Lyon's Grain Cleaner.

We present on this page an engraving of a new grain cleaner of California design and manufacture. Its length is about 14 ft., and its extreme height nearly 8 ft., and its weight is a little over 4,000 lbs.

When in operation the larger elevator on the left is lowered to the ground, and the wheat is put into the hopper near the lower end. It is then carried up and discharged into the hopper on the top of the machine, from where it passes over a great number of large screens, having a rapid and short vibration endwise, and finally comes out pure wheat, all the barley, cheat, mustard seed, white caps and other foreign matter having been separated from it, and carried into compartments by themselves. The smaller elevator returns for recleaning the wheat which gets carried over with the tailings, as they are termed. A blast of air from the fan carries off all the light matter.

The distinguishing feature of this machine is the great number and area of its screens, thus allowing the wheat to pass over them in a thin sheet and to continue upon them for a period longer than usual, and until everything is taken

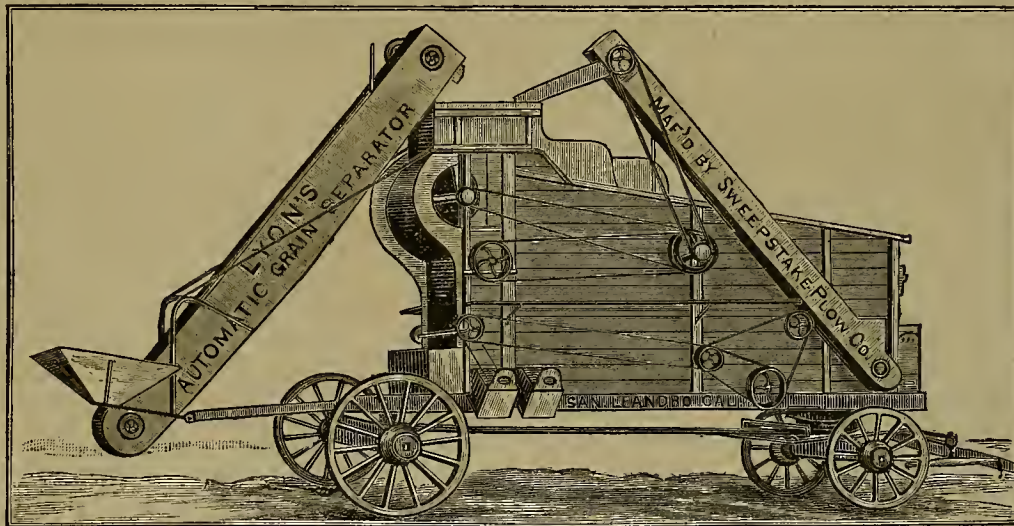
The Spenceville Copper Mines.

We learn from a late issue of the Nevada City Transcript that the copper mines at Spenceville are destined to become a conspicuous feature of the mining industry of Nevada county. In addition to the copper property mentioned, which is now shipping to this city ingots of marketable copper, and is on a paying basis, another copper mine, known as the American, situated about three miles above Spenceville, is looming up with great promise. The mine was visited lately by the editor of the Marysville Ledger, who has published some interesting details of the works. The mine was located by Mr. Bitner in 1876. There are two claims, each 1500 ft. long and 600 ft. wide; besides these, there is a tunnel claim 3,000 ft. long and 750 ft. wide. This tunnel will cut a series of four parallel veins. The surface croppings indicate that the southern vein is 108 ft. wide. The only ones that have been worked are the two northern; and they have been traced nearly their entire length by means of shafts. Both of these veins have been cut by a lateral drift and are now open. One of the northern veins assays 30% gold and a workable percentage of

copper. The gangue matter is quartz, through which the metallic grains are thickly distributed. The ore of the other vein is a rich-looking copper, which yields by assays from 10% to 70% of that metal. It is believed that each of these veins will develop a width of 70 to 90 ft. Heretofore only that quality of ore was sought that would pay for shipping; but lately Mr. Holland, one of the owners of the property, has roasted the ore very successfully. His process is simple. After a ten days' roasting of the ore, he leaches it in an old-fashioned hopper, the strong copper solution being caught in a wooden tank. It is then lead into a wooden trough and heated, and old scrap iron is introduced. The copper cement collects upon the iron, from which it is freed and cleaned. It is then ready for the market. These simple and inexpensive works have a capacity of about 50 pounds per day; they expect to extend them shortly to a daily yield of one ton. The owners have a process, which they will soon introduce, from which they believe a large economy will result both in time and money. Other owners of copper mines in the locality are trying the simple means for producing the cement which we have described, but we have no accurate returns of the results as to production and cost.

HUMBOLDT REDUCTION WORKS.—These reduction works, says the Silver State, are to be repaired and started up immediately. This news will be hailed with joy by many prospectors and mine owners in this county and along the railroad east and west of Humboldt. Since the works were closed down, owners of mines on which there are no mills have been obliged to assort their ores to a high grade and ship them to Salt Lake or San Francisco at a great expense. This has been very detrimental to the mining interests of this county and discouraging to prospectors, as ore that did not assay at least \$150 to the ton would not pay the expense of shipping them nearly 500 miles to reduction works. Henceforth there will be no necessity for this, as the most refractory ores, as well as the freest ores, can be worked here. Ores in any quantity, from a cack to a 1,000 tons, will be sampled upon its delivery at the mill and paid for in gold coin. The works will be thoroughly repaired and put in first-class order at once, so that miners who have ores on their dumps can convert them into coin by shipping them here at their earliest convenience.

THE President will leave Washington for California about Sept. 1st.



A NEW GRAIN CLEANER OF CALIFORNIA DESIGN AND MANUFACTURE.

about 25 miles from San Luis Obispo city. The Tribune describes the variety as agate, and says the deposits or quarries have been sold to Kessler Bros., the proprietors of extensive marble works in this city, who design working it immediately. It occurs in layers of varying length and thickness, and between each layer there is a stratum of clay. The colors are various, the principal being white, grayish white, and of a pink shade. When it is dressed the stone is translucent, and presents a beautiful appearance. The owners contemplate manufacturing this chalcedony into mantels and other house ornaments, as its use will give an elegant finish to a residence. The working of the quarries will afford employment to a large number of men and teams, as the rough stone will be hauled to San Luis Obispo for shipment.

A RICH DEPOSIT.—According to the Mining Index, the May Lundy mine, in Homer district, Mono county, is an immense mineral deposit and very rich. The croppings are hold bluffs of from 12 to 25 ft., and are rich in gold with some silver. Hundreds of tons of the ore on the surface will yield largely. At 254 ft. below the surface there are no indications of pinching or of a giving-out in richness. Twelve miners are now engaged in taking out and sacking the richest of the ore, which will work \$600 and upward to the ton, and the second-class ore, which will yield \$200, is stacked up for future use when the district is supplied with milling facilities, while the third-class—which, according to the Index, would be called high-grade ore in Bodie—is not taken out at all.

from the grain that the screen is capable of taking from it. The very great breadth of the screens (five ft.) and their rapid motion permits the grain to go through with great rapidity, notwithstanding the very thorough action of the screens. Sixty tons per day can be easily cleaned, so it is claimed, and the work is said to be perfect. From the above it will be seen that this cleaner is a very rapid and powerful machine, and is expected to do work that for speed and thoroughness has not hitherto been attempted.

MR. J. S. PHILLIPS, M. E., formerly of San Francisco, but now of No. 1 Wall street, New York, came to this city this week, en route to the Owens River valley, where he is to examine a mine for Eastern capitalists. The mine is the old Chrysopolis, about 10 miles above Independence, Inyo county. A 20-stamp mill was erected on this property some 15 years ago, but they failed, in some way, to treat the work successfully, and it has been idle ever since. Mr. Phillips will thoroughly examine the five or six veins of the mine, and will take a number of men with him to prospect the works clearly. If he condemns the mine, he will return in five or six weeks. If he approves, he will remain longer and start it swinging. Mr. Phillips has had many years practical experience in the mining business, and is the author of "The Explorers', Miners' and Metallurgists' Companion." The Eastern people have this time sent a man to examine for them who is practical in his views.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Mineral King District, Tulare County.

[Written for the Press by J. W. A. WRIGHT.]

The Empire mill started Wednesday last, as was proposed. Friday it made its first 24 hours' run this season and by 8 p. m. that day had crushed 60 tons of ore. Your correspondent is assured by good authority that nearly as much amalgam had been collected in these first three days as in its three weeks' run last November and December. The ore appears to be milling better than on its former trial, and parties most interested seem pleased with the result so far. But these results to date will be given at the close of this letter.

The Hallidie Wire Ropeway.

Or tramway, as it is here called, is working admirably, and greatly lessens the expense of delivering ore at the mill, and lumber with other supplies at the tunnel. As this is one of the most ingenious and interesting labor-saving inventions of our day, a brief description will be given for your readers who are not familiar with it.

Its main features are an endless wire-cable passing around two horizontal iron wheels with diameter of about 8 ft. one wheel at the mill, the other at the mine 2,000 ft. above it and over a mile distant. Every 200 ft. is a support or station made of four leaning supports of 10-inch timber 15 or 20 ft. high, or of the trunks of trees cut down to the proper height, where the tramway passes through the wood. On top of these supports is a strong horizontal beam, on each end of which is fastened a small grooved iron wheel over which the ascending and descending part of this wire belt passes. The cable used in this tramway is $\frac{3}{4}$ -inch in diameter and over two miles long. Attached to this cable at intervals of about 100 ft. for its entire length, are

107 Iron Buckets,

Each large enough to carry 100 lbs. of ore; also iron bars so crooked that 400 ft. of lumber of any length can be sent up or down in them; also a car in which two persons can be safely carried to or from the mine. The rods by which all these hang from the cable are so bent and attached to the cable that they easily pass over the supporting wheels.

The weight of the loaded cars (altogether about 5,000 lbs.) is the motive power that carries up the empty buckets, or lumber, or passengers. Each ore-bucket is rigged with a simple contrivance by which its bottom drops down and empties the load as it passes around the large horizontal wheel in the ore-house at the mill. Mr. Harper informs me that the ore is thus delivered from the mine at a

Cost of 20 Cents per Ton.

Breaks easily regulate or stop the motion of the wire.

The Standard mill at Bodie is furnished with a similar ropeway by Mr. Hallidie. To avoid the possibility of future injury from any winter's snow-slide, the new boarding-house for the miners, which must for convenience be near the mine, is being built of logs, is 20x100 ft., and is located on a ridge in the woods through which the tramway passes, at an altitude about 9,500 ft. Usually there will be but little danger from such avalanches as that last winter which destroyed the former lodging-house, for then a most uncommon amount of snow fell in the continuous storms of April. It fell on top of the winter snow, the surface of which was hard and ice-like, forming a good sliding surface; hence the deep accumulation of fresh snow was readily set in motion.

It is very wonderful that—though Mr. Fleming and 24 others were asleep in the two-story lodging-house when it was struck by the snow-slide April 19th last, torn in pieces, and its fragments scattered for 600 ft. below its site—not one of them was permanently injured. More remarkable still, though they were exposed bare-footed and not half clad for several hours, under and in the snow, before they were rescued early next morning, and though they suffered much in consequence, not one lost a toe or finger by frost-bite.

Getting the Hoisting Engine in the Cave

Of the Empire mine was no small feat of engineering skill. This was done in June while there was still considerable snow on the mountain sides. Mr. Harper informs me the hoiler weighed 2,100 lbs. It was dragged up on a sled by six yoke of oxen, attended by four men, a distance of fully two miles, and in places over an incline of 45°. This alone required two days. The hoisting reel, which weighs 1,800 lbs., was taken up in a similar way. Then there were 175 ft. of 14-inch smoke-stack to take up, that the smoke might be carried, as it is, 25 ft. above the entrance by passing through a natural shaft from the cave.

All this hoisting machinery was in place and ready for use in six days after it reached the tunnel, and in two weeks after it was brought to Mineral King Flat. Machinery could not work better than does all connected with mine and mill at present.

The force now employed in and about the mine numbers 35, and 25 more are soon to be added. There are 14 in the mill and assay department; so they will employ in all about 80 men. I should mention that the assay department is thoroughly equipped. The company

also own a large store well supplied. This is under the special charge of Col. C. B. Wagner, though Mr. Harper has general control of everything. Col. Wagner, who, with W. Davidson, Samuel Smith and two ladies, alone remained here the whole winter, informs me that

The Entire Snowfall

From October to April, inclusive, was 35 ft. Allowing, as usual, 10 inches of loose snow to 1 inch of rain, this would make 42 inches of rain for the past season. Mr. Stephen Barton, who has an interest in several ledges here, informs me that he measured about 22 inches for the season at his place on the Kaweah, 25 miles below here. At Pogue's ranch, where the Kaweah leaves the foothills, 20 miles east of Visalia, the season's rainfall was about 15 inches; at Visalia, 12.81 inches; and at Hanford, 20 miles farther, due west, 12.32 inches.

The coldest temperature here was 2° below zero one morning, and 4° below at another time. The general range of the mercury at 7 a. m. was from 16° to 20°. Some days it did not rise above 32°, though other days it was 90° in the sun. In the town of Mineral King snow stood at one time eight ft. deep. The first snow fell in October, but the ground was not covered constantly till the latter part of January. Bare ground first began to appear again by April 1st, and then the warm season was supposed to be opening. But soon the heavy snows began, lasting about three weeks. There was no bare ground in the "flat" again—altitude 7,500 ft.—till the latter part of May.

Another letter will tell your readers something of the magnificent scenery in this part of our "Higher Sierras."

The Cave in the Empire Mine

Deserves farther notice. Like several other smaller caves in the district, it exists in the great mass of limestone which, on Empire hill and neighboring heights, forms much of the "country rock" hereabouts. The main cave, in which the hoisting engine is placed, and from the floor of which the new winze has been sunk 102 ft., at an angle from 55° to 60°, according to the dip of the ore-stuff, is about 100 ft. long by 20 to 60 wide; while its rough gray roof overhead is from 30 to 100 ft. above you at different points. Before the walls and natural ceiling were made dingy by smoke, they were white and glistening; for the formation is really a coarse-grained white marble, as is shown by fracture. No stalactites or stalagmites appear, however, and this is to be accounted for, perhaps, by a remarkable absence of percolating water. The cave, and winze, and various drifts, and crosscuts, so far as developed, are very dry, so much so that water to run the hoisting engine is introduced through an iron pipe from a stream near the mouth of the tunnel. Not only do several small natural passages find their way upwards to the sloping mountain surface, but if you go 80 ft. into a 140-ft. drift running north, you come to a small and almost horizontal passage, which has been explored by Mr. S. Jewell, foreman of the mine, some 200 ft. by crawling. In this he found some water, and beyond the point he reached, he could hear water falling, and apparently to quite a depth. The irrepressible rat is found occasionally in this cave, the only animal form that finds its natural home in that lofty subterranean chasm.

But let us leave the cave, go to the mouth of the 350-ft. tunnel, enjoy a glance from our 10,000 ft. of elevation at the Tulare plains, their dark strips of timber, their yellow grain fields, the glimmering lake, the shadowy Coast Range mountains more than 100 miles to westward. Then we descend to

The Town of Mineral King.

Two thousand ft., and more, below the tunnel. This is quite a lively hurg for a mining district so little developed, as yet. It consists of two hotels, one boarding-house, one restaurant, two saloons, four stores, and about a dozen dwellings. The population of the district is not far from 200 at present. It is certainly a very quiet, orderly mining town. Before closing this letter, I have had a friendly chat with Mr. Harper, to learn what I may state of the prospect after five days' run of the mill. I am authorized to say that a clean-up will be made about Wednesday; that some bullion will certainly be obtained, not, however, so free from lead and iron as was hoped. Mr. Harper is now satisfied that more of the silver in their valuable ore can be saved by roasting before milling. He will recommend roasting works, which can be erected at an expense of about \$10,000, in a month or less.

Mineral King, Aug. 3d.

IMPORTANT AFRICAN EXPLORATION.—The irrepressible Stanley was on the Congo at last advices, with the view of opening to commerce the very heart of the African continent. His expedition is very strong, comprising 20 white men of different nationalities, and about 100 negroes of Zanzibar, Sierra Leone and the Congo. He has five small steamers and a number of smaller boats, with which he has taken his party and supplies up the river as far as the first of the series of 32 falls on the river. From this point the task of cutting a road through the wild coast range of mountains has been begun, when the boats and supplies will be transported overland past these obstructions to navigation, and then the great river and its tributaries will be navigable to the very heart of Africa. This expedition promises to be the most important undertaking in its practical results, that has ever been attempted in African exploration.

Summit Valley District, Montana.

[By J. E. CLAYTON in the *Mining Review*.]

Summit Valley mining district is situated in the southeastern portion of Deer Lodge county, in a large basin bounded on the east and west sides by high mountain ridges that trend nearly north and south, about 10 miles apart, and on the north and south by high lateral spurs and rolling hills that stretch across east and west from one range to the other, thus enclosing a beautiful mountain valley and basin of low, rolling hills, about 10 miles in diameter.

The Ores and Minerals.

The "gangue-stone" of all the lodes is quartz, more or less mixed with carbonate and silicate of manganese. Usually the quartz gangue largely predominates, but occasionally the manganese is found in greater quantity than the quartz. Above the water line the manganese is oxidized and black or brownish black in color; below water it has a beautiful pinkish and flesh tint. In most of the lodes are found places where the quartz and manganese gangue are mixed or blended with the feldspar-porphry above mentioned. In such cases a portion of the feldspar has been dissolved out and replaced by quartz and the sulphides of other metal such as iron, zinc, copper and lead, carrying silver and gold. Nearly all the gangue-stone below water is heavily charged with the above named sulphides in greatly varying proportions. Above water the sulphides have oxidized and partly leached out, leaving a cellular quartz more or less impoverished by the leaching process.

Native silver and gold are occasionally found in the surface ores, but below the permanent water line in all of the best mines of the district native silver is quite common, in the form of wire silver in the cavities and flake silver in the cleavage lines of the gangue-stone.

A large number of the principal lodes of the district contain free milling ore above the water line, which varies according to locality from 25 to 150 ft. deep, that may be crushed dry or wet, and amalgamated without preparatory roasting. The percentage of metal saved by this method varies from 60% to 80% of the assay values—probably an average saving of 75% of the gold and silver contained in the ore. There is also a large number of lodes in the district that cannot be worked by the free milling process, owing to the large amount of oxide of manganese present, which interferes in some way with the amalgamation of the silver and gold.

Below the water line all the ores of the district are refractory, and cannot be reduced without roasting with salt before amalgamation, hence are called "roasting" ores, in contradistinction to "free milling" ore. At the Alice mill the ore is crushed dry, then roasted with salt in a revolving Howell's furnace, after which it is amalgamated in pans in the usual way. This results in the extraction of 85% or 90% of the silver, and a somewhat smaller per cent. of the gold.

It is, therefore, advisable to erect dry crushing mills, with chloridizing roasting furnaces, at the outset, in order to work all classes of the silver ores contained in the district. Strictly speaking, there are no free milling ores in the district, except portions of the oxidized ore above the water line, as before stated.

Cost of Milling.

I have been able to get reliable information from the Alice, Lexington, Silver Bow and Dexter mills as to the cost of milling the ores by the three methods above named. The Alice mill (20 stamps) crushes dry, roasts the ore in Howell furnaces, and amalgamates in pans in the usual way, at a cost of from \$12 to \$14 per ton. The Silver Bow mill (20 stamps) crushes the ore dry, and amalgamates in pans, without roasting, at a cost ranging from \$8 to \$10 per ton. The Lexington mill (10 stamps) crushes wet, and amalgamates in pans, at a cost of about \$8 per ton. The Dexter mill (15 stamps) crushes the ore wet, and amalgamates in pans, as usual, at a cost of from \$7 to \$10 per ton. These facts show that free milling ore can be reduced in a large way at an average cost of about \$9 per ton, and the roasting ore at an average cost of \$12 per ton.

Cost of Extraction or Mining.

The average mining costs are more difficult to arrive at. The size of the lodes, hardness of the ore and country rock, and the quantity of water to be raised, etc., must be carefully calculated in each special case. In the average lodes, such as range from three to eight ft. between walls, where there is not more than one-fourth waste, \$5 per ton ought to pay all costs of mining, including dead work, timbering and superintendence. I think \$5 per ton is about a fair average estimate for the principal lodes of the district, where proper appliances are used under proper management.

Hauling from the mines to the mills in wagons cost from 75 cents to \$1 per ton, where the distance does not exceed two miles, thus making a total of \$15 per ton for mining, hauling and milling the free ores, and \$18 to \$20 per ton for the sulphureted ore that require roasting. This, I think, is about a fair average estimate of costs.

The workable ores of the district comprise all the ore that will pay the costs of mining, hauling and milling, and the percentage of loss in reduction. The free milling surface ores must therefore give an average assay value of \$20 per ton to pay expenses and losses, and the roasting or refractory ore must carry about \$25

per ton. All ores of a higher grade will therefore give a net profit.

It must be borne in mind that the above estimates are based upon what is being done now. When we get railroad transportation, larger reduction works, and more skill in reducing the ores of the district, the work can be done at less cost.

The quantity of workable ore in the district that will assay \$20 to the ton and upwards, is enormously large, enough, in my opinion, to employ 1,000 stamps for 20 years to come. The workable ore taken in general, may be said to range in assay value from \$20 to \$200 per ton. The larger figures are, of course, exceptional, but as we approach the lower sum the quantity becomes immense. Forty dollars will probably represent the value of nine-tenths of the workable ores of the district, but it is too early in its history to undertake any close estimate of either quantity or average values. With the present partial developments we know there is a great number of large, strong, true fissure lodes, carrying good pay—certainly more than I have ever seen in any district of the same area—say three miles square, and that in the few instances where they have been penetrated below the water line, the ores show a largely increased value.

For quantity of good workable ore, characteristics of permanence, good local facilities and fair average mountain climate, Summit Valley mining district bids fair to become one of the most productive and profitable mining centers in the United States.

The Old Ophir Dump.

Parties are engaged in drifting out the lower stratum of the waste dump of the old Ophir, says the *Territorial Enterprise*. They have made a large excavation on the west side of North A street, that reaches down to the original surface soil, and from thence are drifting out under the barren waste. The stratum that is being mined out was deposited in 1863, and is of a reddish-yellow color, while the barren waste of later date is of a blue shade. The ore taken out is said to average about \$40 per ton. It is being hauled to a mill on Six-Mile canyon for reduction. In taking out this old-time waste some lumps of fine sulphuret ore are occasionally met with, showing that miners in the early days were very careless, tumbling down and sending out with the waste not a little good ore. It is known that much good ore still remains in the sound ground, from the surface down to a depth of 200 or 300 ft., in the old Ophir, Mexican and California ground. It has been many years since any work has been done in any part of the old surface ground. Mexicans who worked in said mines in former times have long had an itching to get into them on almost any terms. They evidently know of excellent pickings that were left behind. When this first work was done Americans knew very little about silver ores. Many Mexicans were employed, and our people were guided by what they said in regard to following up ore seams and in the extraction of ore. These men probably left behind some fat spots, with a view of getting at them on their own hook at some future time. It would doubtless pay well to give these old upper levels a thorough overhauling. There is probably stowed away in them as waste much rock that would now pay well for working.

A PROJECTED TUNNEL.—The projected tunneling of Mont Blanc is engaging the serious attention of French engineers, and, contrary to common opinion, they characterize it as an easier undertaking than that of the Simplon route. The estimates of cost for executing such a work are, in the case of the Simplon, about \$27,000,000, and in that of Mont Blanc only \$15,000,000. Furthermore it is claimed that the Mont Blanc tunnel will make the journey from Paris to Genoa some 97 kilometers shorter, and from Paris to Milan 44 kilometers shorter than by the Simplon route. The location of the tunnel is a point which has given rise to various opinions, but that which meets with special favor from the advocates of the enterprise is from Chamounix to Courmayeur.

NEW EXPLORATION.—We learn from the *Enterprise* that work is about to be resumed at this mine—situated at the north end of the Comstock, beyond the Utah—with a full force of men. The company now have everything in shape for steady work and expect to thoroughly prospect their ground before making another halt. It is a wholly unexplored region. As prospecting has never been pushed far outside of the city to the northward, the Keystone shaft is a start toward the showing up of the unknown region in that direction.

PARTIES ARE NOW AT WORK upon the coal mines in the Cajon Pass, says the *San Bernardino Independent*. Those interested as owners have sold to the railroad company for a good round sum if they can show the bed to be four ft. in thickness. From what is stated, it will not be long before it will change ownership, as they have about that in sight.

"RICHER than ever" is the report from the Prospect Flat mine, El Dorado county. The ground now being worked is as rich as the famous Bald Mountain of Sierra county. It has long been the belief of competent judges that there is a large area of fine gravel in that portion of the old channel.

MECHANICAL PROGRESS.

About Pressed Glass.

One of the features in connection with the glass trade not generally known is that the first article of pressed glass made was manufactured in this country. The way in which this branch of the manufacture came to be discovered was rather peculiar. In fact it owed its origin to a Massachusetts carpenter. The discovery came about in this wise: A carpenter who lived in the town of Sandwich, Mass., wanted an article of glassware made for some purpose not known now, and went to Doming Jarvis, who had a glass factory in Sandwich in 1827, and asked him if he could make the article desired. Mr. Jarvis told him that he could not make it, as it would be impossible for the glass-blowers to make such an article. This did not satisfy the carpenter, who was of a mechanical turn of mind, and he wanted to know if a machine could not be made to press glass into any shape. This idea was scouted at first, but, upon second thought, Mr. Jarvis and the carpenter got together and fashioned a rude press, and made their first experiment. This machine was intended to make tumblers, and when the hot molten glass was poured into the mold, which was to determine whether glass could be pressed, the experiment was witnessed by many glass-makers of that time. They were nearly all of the opinion that the experiment would come to naught, and were greatly amazed when the result of the experiment demonstrated that it was possible to press glass. From that time the manufacture of articles of glass by the use of pressing machines gradually developed until to-day the bulk of the glass manufactured in this country is made with presses. The first tumbler manufactured in the rough improvised press alluded to above, remained in Mr. Deming's possession for many years, and then passed into the hands of John A. Dobson, a well-known glass dealer in Baltimore, and at the Centennial exhibition the tumbler was broken by Mr. John H. Hobbs, and the fragments are now on exhibition in Philadelphia. The pressed ware manufacturers in America lead the world to-day in that class of goods, while the French and Belgian manufacturers exceed in blown ware. Nineteenth of the glass beer mugs used in Germany to-day in the beer halls and gardens are made in this country. The glass presses have been applied to almost all departments of the manufacture, and every day brings forth some improvements, which are gradually raising pressed glass up to the highest standards.

BOILER COVERING.—A correspondent of the *American Machinist* describes a tin boiler covering which has been tried with good effect on marine boilers to lessen the loss of heat by radiation from the surface of the boiler. The tin is supported by bands made of $\frac{1}{2}$ -in. band iron. Ties riveted to these bands keep them far enough from the boiler to insure an air space of from two to four inches and are placed close enough together to keep the band in shape. The bands are placed in position and IX charcoal tin put on in strips 22 inches wide by long enough to go around the boiler outside the bands with two lugs or clips to screw them together with. The end of the heater has a cover like a mammoth teapot cover made in halves the rim of which is slipped over the first band and covered by the first section of tin. Where the mud ports come, a hole is cut in the tin and provided with a rim with a flange extending to the boiler. At the front the tin covering is closed in against the boiler. The air inclosed by the covering is kept sufficiently humid by "fizzing" to make it a poor conductor and the tin throws back a large part of the heat which is radiated from the boiler.

HARDENED PAPER.—It has recently been discovered that by submitting paper or paper pulp to the action of chloride of zinc, and afterward subjecting it to heavy pressure, a substance is produced resembling in its characteristics both wood and leather. The new substance is capable of a great variety of applications, and is getting to be extensively used in the arts. There are also several other methods by which paper is converted into a leather or parchment-like substance, the product varying in character according to the treatment. One curious and useful application of these processes is to form the paper into rolls or sheets suitable for packing, and then, when in the pasty state, sprinkle plumbago upon it, and by strong pressure thoroughly incorporate pulp and plumbago together. The resulting compounds are found to make a most excellent packing for steam engines and pumps. —*Northwestern Miller.*

LARGE FORGINGS.—A steel shaft forged by Krupp, at the Essen works, for the steamer *Harry Brown*, built at Pittsburgh, weighed 10 tons. Another shaft, forged with three cranks and coupling-flanges, exhibited in Mr. Krupp's group of forgings at the Philadelphia Centennial exhibition, weighed 13½ tons. This is, however, a small weight compared with that of many shafts made by the same firm for ocean steamers. The forging for the large Krupp gun exhibited at the Centennial was more than three times this weight. Probably the largest steel forging ever made was a shaft produced at Essen several years ago. This shaft was 30 inches in diameter and 70 ft. in length.

Selecting Tool-Steel.

Hardness, tenacity, facility for working under the hammer, and of receiving temper, are requisites of good tool-steel. The presence or absence of some of these qualities cannot be ascertained except by actual experiment; yet good judgment will enable a man to ascertain, with an approach to accuracy, the quality of steel without subjecting it to the action of fire and water and the hammer.

Pure iron contains no carbon; but tool-steel contains from 1% to 2%. So small is this amount, that it is not surprising that it requires judgment and experience to select steel in the bar. One of the tests is to apply a drop of nitric acid to the surface of a fresh fracture. It will leave a black stain on good steel, but not on iron or low steel. Another test is to observe the color and texture of a freshly-made fracture. This should present a fine grain, with a dull, silvery luster, and of uniform color. Poor steel may show a close grain, but it will be mottled in color.

But the only sure test is in working the steel. Draw the end of the bar, heated to cherry-red, under the hammer, to a fine point. If it will admit of being so pointed, that is a good indication. Plunge it into the hardening bath while hot; and, when chilled, give it a few gentle blows with the hammer. If it is tough and does not fly, but requires some hammering and bending back and forth to break it, that is another good indication. If the fracture shows a fine, even, lively grain, the test is complete, and the workman may be satisfied. One of the best tests is to make and temper a cold-chisel from the bar. If it stands well the chipping on a casting, the steel will make good turning tools. But, after all, the good judgment of the experienced forger is worth more than empirical tests. —*Manufacturer and Builder.*

CASTING GAS PIPES VERTICALLY.—The subject of casting gas pipes vertically in 12 ft. lengths bids fair to become one of considerable importance in the estimation alike of pipe foundries, gas managers, gas companies, etc. It seems that vertically-cast pipes of that length down to four inches in diameter are extensively produced in the U. S., whereas in Glasgow, which is the largest seat of the pipe founding industry in the world, it is seldom that such pipes are made of less than 15 inches in diameter. Two or three Glasgow firms are said to have tried to produce pipes of the kind referred to down to eight inches in diameter; but owing to the great difficulties connected with their foundry plant, waste, etc., the results have been anything but satisfactory. It is urged that Scotch pipe foundries should not hesitate to spend some effort in learning what improvements have been made in pipe-founding in America, so that 12-ft. lengths of piping have become a regular article of trade. Doubtless gas managers would welcome the advent of such pipes in this country, as their use would effect a great amount of economy in jointing, and therefore a large saving in leakage which has so widely and so frequently to be deplored. —*Journal of Gas Lighting.*

EFFECT OF HIGH SPEED OF ENGINES UPON CONDENSATION OF STEAM.—At the recent meeting of the Master Mechanics' Association, Mr. C. A. Smith, of St. Louis, reported the results of a series of experiments made to ascertain the temperature of steam cylinders during the working of the engine at varying speed. The experiments were made upon a locomotive hauling a light passenger train, the steam being throttled except at highest speed, and were continued through a run of 33 miles. It was found that, whereas when the engine was making about 50 revolutions per minute the instrument indicated a change of temperature of 120° during each stroke, at 100 revolutions per minute the variation dropped to 60°, at 200 revolutions to 30°, and 300 revolutions to 20°, the amount of variation being thus inversely proportional to the speed.

ELECTRICAL BOILER INDICATOR.—By means of an electrical indicator invented at Rouen, France, the water level in a steam boiler may be ascertained at any distance from the latter. The apparatus consists of an indicating tablet, which may be placed in any part of the establishment, connected with the electric indicator which is fixed at the top of a vertical tube above the boiler. Wires and platinum plates are so arranged that when the water in the boiler sinks to a certain point, an electric current is established which rings a signal, while at the same time the sign "low water" appears on the indicating tablet.

PROTECTING IRON FROM OXIDATION.—Mr. Bower's plan for protecting iron against oxidation by treating the cleansed surfaces in a chamber of suitable size with heated air, and subsequently reducing any red oxide that may have been formed by the introduction of reducing gases, is reported in London *Iron* to have been developed on the commercial scale very satisfactorily. It is said to have become a dangerous rival to the process of Barff, who employs superheated steam for the same purpose.

A STEAMER known as the *Anthracite* is on the way from Falmouth to New York. The voyage is for the purpose of testing a new system of tubular boilers. The boilers are charged with fresh, distilled water, which, after being condensed into steam once, may be re-condensed and re-used with very little loss in quantity.

SCIENTIFIC PROGRESS.

Progress in Chemical Discovery.

The progress of chemistry, when viewed from the position attained by advanced workers in the science, presents possibilities of discovery in the near future that are calculated to startle even philosophers of the *nil admirare* sort.

The most obvious manifestations of change that meets the student of twenty years ago, is the revolution that has taken place in the nomenclature of the science—a change that has completely robbed his acids, alkalis and salts of their old familiar aspects, and which perhaps more forcibly than anything else indicates how complete has been the change in chemical thought within this comparatively brief period. But however radical may have been the changes that have taken place in the views of chemists respecting the methods of indicating the molecular arrangement of chemical compounds, these innovations are trifling when compared with the views entertained by certain advanced thinkers respecting other questions of prime importance.

The stability of the elements themselves is now being questioned. Lockyer, not long ago, advanced the opinion, based upon spectroscopic evidence, that the so-called chemical elements were in reality not simple, but compound bodies; and hardly had the chemical world recovered sufficiently from the perplexity into which Lockyer's bold hypothesis had cast it, than the brothers Meyer announced its most startling verification in their remarkable experimental dissociation of chlorine and the other halogens. Changes of opinion no less radical have taken place likewise respecting the functions and properties of the different portions of the spectrum. It is now known that the whole of the spectrum acts actinically. Capt. Abney has demonstrated the fact most amply by preparing a form of silver bromide that is sensitive not only to the ultra-violet rays and the whole of the visible spectrum, but likewise to the infra-red, and has presented to the Chemical Society of London a magnificent map of the infra-red spectrum. How far these remarkable discoveries may pave the way to the realization of photographs in natural colors, or what surprises may be in store for us in the investigation of the infra-red absorption spectra of various substances, no one can venture to say.

We will now turn to another active field of discovery—that of organic chemistry—and progress no less remarkable confronts us. Following up the path opened by Hofmann, Perkins, Graebe and Lieberman, in producing the anilines and alizarin—the coloring principle of the madder root—other chemists no less diligent and far-sighted, are boldly attacking the problem of the constitution of other and even more complex substances, and it is by no means improbable that in the near future we may witness the artificial production of indigo and the organic alkaloids on a commercial scale. —*Manufacturer and Builder.*

EXPLOSION OF TOUGHENED GLASS.—A correspondent of the London *Nature* writes from Sonnighill, Eng., under date of July 7th, as follows: The night before last a lady of my family emptied a paper powder composed of seven and one-half grains of carbonate of potash and seven and one-half grains of carbonate of soda into a tumbler of what is called toughened glass less than half full of cold water. After stirring the mixture she drank the contents, leaving a silver teaspoon in the tumbler, and then placed the empty tumbler on the table by her side, within perhaps a foot of a burning duplex lamp. About five minutes afterwards a sharp explosion occurred, which startled all in the room. We found the tumbler shattered into fragments, the body of the glass ripped up, as it were, into several large, irregular-curved pieces, and the bottom of the tumbler broken into small pieces more resembling thick rough ice than anything else. Query: Was the explosion caused by the inherent properties of the toughened glass, or by the contact of potash, soda, the silver spoon and proximity to a lamp, the heat from which was very slight, indeed scarcely perceptible to the hand at the spot where the tumbler stood? The accident might have been very serious, for pieces of the glass flew to within a very few inches of the lady's face. A solution of the cause of the explosion is therefore of considerable importance to all who may have occasion to use vessels of this peculiar glass.

ARTIFICIAL CORUNDUM AND SPINEL.—M. Meunier has succeeded in making artificial corundum and spinel. The latter is made by heating together to redness, in a porcelain tube chloride of aluminum and magnesium and conducting steam over them. The tube will, after cooling, contain an apparently amorphous mass, which, however, is found under the microscope to consist of minute octahedrons. Gahnite is obtained by using zinc instead of magnesium. Corundum is produced in the same manner in which Gay Lussac obtained hematite or iron glance, by the decomposition of chloride by means of steam, and Daubree cassiterite with the aid of tin chloride. Meunier simply decomposes chloride of aluminum by means of steam, at a red heat, and obtains hexagonal plates of artificial corundum, the same substance as the sapphire, the ruby and the emery. —*Iron Age.*

ON THE DETERMINATION OF SULPHUR IN COAL. Nakamura, a student in the Engineering College at Tokio, has devised a new process of determining sulphur in a coal, which seems to work well. It consists in heating the coal below a red heat in contact with alkaline carbonates, by which the coal, whether bituminous or not, rapidly undergoes, without evolution of smoke, complete staphoric oxidation in a manner hardly to have been expected. On one part of coal, in very fine powder, take three or four parts of the mixed alkali carbonates. Mix intimately in a platinum dish, and heat at first gently, using alcohol in place of gas, to avoid the sulphur of the latter. Raise the heat very slowly, not reaching a visible red until the surface of the mass becomes faintly gray. Then heat to a faint red, and keep it there for an hour, when the mass will be nearly or quite white. It is then treated with water, filtered, and the sulphuric acid determined in the filtrate, as usual. The complete combustion of coal and coke at so low a temperature is noticeable. The carbonate seems to exert no chemical action in the case, but acts mechanically, apparently the spaces between the particles allowing a draft of air, and the combustion proceeding from the bottom toward the top. Direct experiment shows no loss of sulphur, and comparative tests prove the results to be accurate. The complete roasting process occupies about an hour and a half. —*Jour. Chemical Society.*

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE will hold its 29th annual meeting for this year in Boston, commencing on Wednesday, August 25th. It is expected that this will be the largest and most important meeting of this body hitherto held. Persons desirous of becoming members and taking part in its exercises, with all the privileges of membership, can do so by forwarding the fee of \$8, in advance, to the Secretary of the Association. To all such members tickets will be sent. Any person may become a member of the Association upon recommendation in writing by two members or fellows, nomination by the Standing Committee, and election by a majority of the members and fellows present in general session. Blank forms for recommendation to membership will be furnished on application by letter or otherwise to the permanent Secretary, F. W. Putnam, Esq., Boston.

ARTIFICIAL QUARTZ.—Many different methods have been used for the artificial production of quartz. Crystals were made by Senarmont by heating gelatinous silica with hydrochloric acid; by Danbree, by means of the action of superheated water upon glass; by Hantefenille, by treating silica at a temperature of 750 to 800° C. with sulphate of soda. Friedel and Sarasin have recently employed a different method. They placed in a closed steel tube lined with copper a mixture of potash, alumina and an excess of amorphous silica, water being present. After exposing the tube to a dark red heat for periods varying from 14 to 38 hours, they found that almost the entire quantity of silica was crystallized, small, quite fully developed individual crystals being obtained also.

REDUCING POWER OF GRAPE-SUGAR.—Prof. Botger highly recommends the use of glucose in alkaline solution for the reduction of salts of silver, affirming that there is no procedure that is so convenient or which gives surer results. He proceeds in the following manner: Chloride of silver freshly precipitated and well washed, is suspended in a suitable quantity of a diluted solution of caustic soda. To this a small quantity of glucose is added, when, on boiling for a few minutes, a complete reduction takes place. The metal, if collected, washed, and slightly calcined, may be obtained in form of a spongy mass of dull white color. The same method yields a very active platinum black.

MAN ON THE AMERICAN CONTINENT.—In a recent lecture by Prof. Flower, before the Royal College of Surgeons in London, the question of the origin of man on the American continent was discussed at some length. The statement was made that, "taking all circumstances into consideration, it is quite as likely that Asiatic man may have been derived from America as the reverse; or both may have had their source in a common center, in some region of the earth now covered by the sea."

A NEW PHENOMENON OF MAGNETISM.—It is well known that the ratio between the residual and the temporary magnetism of a bar of steel enveloped by a magnetizing coil, diminishes as the bar becomes shorter and thicker. M. Aug. Kighi was led by theoretical considerations to a conclusion which is opposed to ordinary phenomena, but which experience has confirmed in every particular. It is this: If we take bare of the same steel and of the same diameter, but of diminishing lengths, we finally reach a length which shows no magnetization, and with still smaller lengths we obtain a residual magnetism which is opposite to that of the coil.

IRON AND HYDROGEN.—At a late meeting of the English Institution of Mechanical Engineers, according to a correspondent of *Nature*, Prof. Hughes stated, in relation to the occlusion of hydrogen in steel and its influence in hardening, that the experiments which he had made did not support the ordinarily-accepted hydrogen theory; but rather the view that *hardened steel* was an actual alloy of carbon and iron, while *unhardened steel* was simply a mechanical mixture. Experiments are now in progress, designed to test the truth of this view.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending July 22	Week Ending July 29	Week Ending Aug. 5	Week Ending Aug. 12
Alpha.....	43 1/4	44 1/4	45 1/4	46 1/4
Alta.....	1.40	1.40	1.40	1.40
Andes.....	800	700	600	500
Alps.....	500	450	400	350
Argenta.....	500	450	400	350
Atlantic.....	450	400	350	300
Aurora Tunnel.....	1.90	1.20	1.05	1.00
Belcher.....	200	250	250	150
Belmont.....	80	80	80	80
Best & Belcher.....	1.65	1.10	1.10	1.10
Bullion.....	1.10	1.05	1.10	1.10
Bechtel.....	750	600	600	600
Belle Isle.....	5	4.50	5	4.50
Bodie.....	20	20	20	20
Benton.....	20	20	20	20
Bulwer.....	20	20	20	20
Boyle.....	350	300	300	300
Black Hawk.....	2.00	2.00	2.00	2.00
Belvidere.....	2.00	2.00	2.00	2.00
Booker.....	450	450	450	450
Caledonia.....	2.05	2.05	2.05	2.05
California.....	2.05	2.05	2.05	2.05
Challenge.....	2.05	2.05	2.05	2.05
Chollar.....	2.05	2.05	2.05	2.05
Endowment.....	2.05	2.05	2.05	2.05
Con Imperial.....	2.05	2.05	2.05	2.05
Con Virginia.....	2.05	2.05	2.05	2.05
Crown Point.....	2.05	2.05	2.05	2.05
Con Washoe.....	2.05	2.05	2.05	2.05
Champion.....	2.05	2.05	2.05	2.05
Concordia.....	2.05	2.05	2.05	2.05
Dayton.....	2.05	2.05	2.05	2.05
DeFrees.....	2.05	2.05	2.05	2.05
Dancy.....	2.05	2.05	2.05	2.05
Day.....	2.05	2.05	2.05	2.05
Eureka Con.....	2.05	2.05	2.05	2.05
Exchequer.....	2.05	2.05	2.05	2.05
Gen Thomas.....	2.05	2.05	2.05	2.05
Grand Prize.....	2.05	2.05	2.05	2.05
Gila.....	2.05	2.05	2.05	2.05
Golden Charlotte.....	2.05	2.05	2.05	2.05
Golden Terra.....	2.05	2.05	2.05	2.05
Goodshaw.....	2.05	2.05	2.05	2.05
Gould & Curry.....	2.05	2.05	2.05	2.05
Hale & Norcross.....	2.05	2.05	2.05	2.05
Hillside.....	2.05	2.05	2.05	2.05
Highbridge.....	2.05	2.05	2.05	2.05
Homestake.....	2.05	2.05	2.05	2.05
Hussey.....	2.05	2.05	2.05	2.05
Independence.....	2.05	2.05	2.05	2.05
Julia.....	2.05	2.05	2.05	2.05
Justice.....	2.05	2.05	2.05	2.05
Jackson.....	2.05	2.05	2.05	2.05
Joe Seaton.....	2.05	2.05	2.05	2.05
K & K Con.....	2.05	2.05	2.05	2.05
Kentuck.....	2.05	2.05	2.05	2.05
Kosuth.....	2.05	2.05	2.05	2.05
Keystone.....	2.05	2.05	2.05	2.05
Lady Bryan.....	2.05	2.05	2.05	2.05
Lady Washington.....	2.05	2.05	2.05	2.05
Leopard.....	2.05	2.05	2.05	2.05
Leviathan.....	2.05	2.05	2.05	2.05
Leeds.....	2.05	2.05	2.05	2.05
Lee.....	2.05	2.05	2.05	2.05
May Belle.....	2.05	2.05	2.05	2.05
Modoc.....	2.05	2.05	2.05	2.05
Manhattan.....	2.05	2.05	2.05	2.05
Martin White.....	2.05	2.05	2.05	2.05
McClintock.....	2.05	2.05	2.05	2.05
Meadow Valley.....	2.05	2.05	2.05	2.05
Mexican.....	2.05	2.05	2.05	2.05
Mides.....	2.05	2.05	2.05	2.05
Morning Star.....	2.05	2.05	2.05	2.05
North Con Virginia.....	2.05	2.05	2.05	2.05
New York.....	2.05	2.05	2.05	2.05
Northern Belle.....	2.05	2.05	2.05	2.05
New Coso.....	2.05	2.05	2.05	2.05
Navajo.....	2.05	2.05	2.05	2.05
Occidental.....	2.05	2.05	2.05	2.05
Ophir.....	2.05	2.05	2.05	2.05
Oriental.....	2.05	2.05	2.05	2.05
Overman.....	2.05	2.05	2.05	2.05
Parish.....	2.05	2.05	2.05	2.05
Phenix.....	2.05	2.05	2.05	2.05
Phil Sheridan.....	2.05	2.05	2.05	2.05
Potosi.....	2.05	2.05	2.05	2.05
Prospect.....	2.05	2.05	2.05	2.05
Raymond & Bly.....	2.05	2.05	2.05	2.05
Richer.....	2.05	2.05	2.05	2.05
Rough & Ready.....	2.05	2.05	2.05	2.05
Seg Belcher.....	2.05	2.05	2.05	2.05
Sierra Nevada.....	2.05	2.05	2.05	2.05
Silver Hill.....	2.05	2.05	2.05	2.05
Silver King.....	2.05	2.05	2.05	2.05
Silver Pine.....	2.05	2.05	2.05	2.05
Silver Star.....	2.05	2.05	2.05	2.05
Summit.....	2.05	2.05	2.05	2.05
Solid Silver.....	2.05	2.05	2.05	2.05
South Bodie.....	2.05	2.05	2.05	2.05
South Standard.....	2.05	2.05	2.05	2.05
Star.....	2.05	2.05	2.05	2.05
St. Louis.....	2.05	2.05	2.05	2.05
Syndicate.....	2.05	2.05	2.05	2.05
Tioga Con.....	2.05	2.05	2.05	2.05
Tiptop.....	2.05	2.05	2.05	2.05
Trojan.....	2.05	2.05	2.05	2.05
Union Con.....	2.05	2.05	2.05	2.05
Utah.....	2.05	2.05	2.05	2.05
Vermont Con.....	2.05	2.05	2.05	2.05
Ward.....	2.05	2.05	2.05	2.05
Wells Fargo.....	2.05	2.05	2.05	2.05
Woodville.....	2.05	2.05	2.05	2.05
White Cloud.....	2.05	2.05	2.05	2.05
Yellow Jacket.....	2.05	2.05	2.05	2.05

Sales at S. F. Stock Exchange.

Thursday A.M., Aug. 12	1550	Albion.....	35@300
520 Alta.....	1.95@2.00	100 Belmont.....	150
600 Andes.....	2.00	200 Bodie.....	200
50 B & Belcher.....	1.20	120 Bulwer.....	2.20
1155 Belcher.....	3.10@3.20	10 Bodie.....	4.40
780 Benton.....	1.65	260 Belle Isle.....	80@85
175 Bullion.....	1.10	10 Bechtel.....	1
130 Challenge.....	1.10	150 Boston.....	75@81
250 Caledonia.....	4.50	400 Belvidere.....	1@2.40
15 Con Virginia.....	3.80	850 Champion.....	30@250
50 California.....	2.40	20 Concordia.....	500
220 Chollar.....	2.35@2.40	135 Grand Prize.....	500
400 Crown Point.....	11@11.50	400 D Standard.....	500
500 Con Imperial.....	2.50	5 Eureka Con.....	151
50 Exchequer.....	1.65	200 E M Diablo.....	300
120 Golden Gate.....	30@300	200 Goodshaw.....	1
250 Gould & Curry.....	3.45@3.50	500 Holmes.....	1.50
335 Hale & Nor.....	3.90@4.00	200 Independence.....	300
330 Julia.....	4.50@4.55	200 Juniper.....	1.30@1.40
705 Justice.....	70@600	200 K Whim.....	100
25 Kentuck.....	2.10	400 McClinton.....	200
750 Lady Wash.....	30@250	485 Mt Potosi.....	100
215 Mexican.....	7.80	200 McClintock.....	200
50 New York.....	400	180 Mammoth.....	1.40@1.50
180 Ophir.....	7.70	200 Mono.....	1.40@1.50
70 Overman.....	7.70	300 Meta.....	500
50 Occidental.....	1.20	20 Mt Diablo.....	100
400 Phil Sheridan.....	300	200 N Belle Isle.....	45@500
630 Potosi.....	2.05@2.10	350 Navajo.....	500
30 Quinn.....	1.10	50 Noam.....	200
10 Seg Belcher.....	7.10	10 Noam.....	200
200 Scorpion.....	1.70@1.80	245 Oro.....	1.20@1.30
690 Savage.....	2.30	200 Paradise.....	350
140 Sierra Nevada.....	1.40	100 Bulwer.....	500
60 Union.....	2.25@2.30	200 Star.....	200
80 Utah.....	9.90	200 Silver King.....	200
685 Yellow Jacket.....	5.50	250 Summit.....	950@21
135 Argenta.....	4.50	120 Toga Con.....	800
950 Addenda.....	80@750	50 University.....	200
		20 Wales.....	3.15

The manufacture of paper bricks is said to be carried on extensively in the West. The quality of the bricks render them well adapted for building purposes.

MINING AND SCIENTIFIC PRESS.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Addenda G & S M Co	California	4	20	Aug 10	Sept 13	T H Dixon	238 Montgomery st
Andes S M Co	Nevada	15	26	Aug 16	Sept 6	Butler Burris	309 Montgomery st
Blackhawk G M Co	California	9	20	July 29	Aug 26	H A Charles	419 California st
Belvidere M Co	California	7	26	July 8	Aug 12	C Van Dyck Hubbard	310 Pine st
Belcher S M Co	Nevada	33	20	June 28	Aug 23	Jno Crockett	327 Pine st
Belcher Con M Co	California	6	25	Aug 11	Sept 17	W H Lent	309 Montgomery st
Booker Con M Co	California	6	15	Aug 10	Sept 16	W H Lent	309 Montgomery st
Champion M Co	California	7	25	July 31	Sept 6	Jno Crockett	327 Pine st
Best & Belcher	Nevada	18	50	July 2	Aug 5	W Wills	309 Montgomery st
Chollar M Co	Nevada	4	50	July 19	Aug 23	W E Dean	309 Montgomery st
Con Imperial M Co	Nevada	12	10	July 15	Aug 19	W E Dean	309 Montgomery st
Con Pacific M Co	California	2	60	July 31	Sept 6	F E Luty	330 Pine st
Crown Point G & S M Co	Nevada	42	50	July 14	Aug 20	James Newlands	8 E Stock Ex
De Fries M & M Co	Nevada	11	20	July 21	Aug 24	Jno McGeoghegan	316 Pine st
Dudley M Co	California	9	25	July 10	Aug 12	E C Masten	309 Montgomery st
Equitable T & M Co	Utah	23	10	Aug 3	Sept 6	Chas J Collins	227 Montgomery st
Gen Thomas M & M Co	Nevada	6	50	July 20	Aug 24	Wm Willis	309 Montgomery st
Gould & Curry S M Co	Nevada	38	50	Aug 5	Sept 9	K Durrow	309 Montgomery st
Hale & Norcross S M Co	Nevada	1	30	June 23	Sept 6	F J Lightner	309 Montgomery st
Highbridge S M Co	Nevada	11	15	July 21	Aug 27	J W Pew	310 Pine st
Leviathan M Co	Nevada	11	15	July 21	Aug 27	F A Pruis	310 Pine st
Mackay G & S M Co	Nevada	4	15	Aug 6	Sept 9	W M Buffington	309 Montgomery st
Mammoth M Co	California	5	50	June 16	July 27	A W Rose, Jr.	302 Montgomery st
Mayville Con M Co	California	5	10	Aug 7	Sept 14	Wm J Taylor	310 Pine st
Mexican G & S M Co	Nevada	12	100	July 15	Aug 19	O L McGoey	309 Montgomery st
Mt Diablo M & M Co	Nevada	3	200	June 22	July 26	Chas N Shaw	408 California st
McCracken Con M Co	Arizona	5	40	June 26	Aug 4	A Wenzelburger	216 Sansome st
Monte Cristo Con M Co	California	3	10	May 26	July 5	Bud Burris	309 Montgomery st
Mt Potosi Con M Co	Nevada	4	25	July 15	Aug 21	E A Holmes	318 Pine st
Murchie G & S Co	California	4	25	July 13	Aug 12	S D Rogers	328 Montgomery st
North Bonanza S M Co	Nevada	6	25	June 30	Aug 4	W W Stetson	309 Montgomery st
Occidental Con G M Co	California	4	10	July 14	Aug 18	W T Smith	402 Montgomery st
Oro M Co	California	5	50	July 14	Aug 16	E B Stuart	320 Sansome st
Savage S M Co	Nevada	45	100	June 28	Aug 3	Wm Holmes	309 Montgomery st
Scorpion S M Co	Nevada	8	10	July 19	Aug 26	Geo R Spinney	310 Pine st
Segregated Belcher M Co	Nevada	17	100	July 31	Sept 3	Geo D Edwards	414 California st
Silver Hill M Co	Nevada	11	100	July 17	Aug 23	E E Dean	309 Montgomery st
Sierra Nevada S M Co	Nevada	61	100	June 22	July 27	E L Parker	309 Montgomery st
Phil Sheridan G & S M Co	Nevada	10	25	June 22	July 24	D L Thomas	327 Pine st
Queen Bee M Co	California	7	10	Aug 9	Sept 14	G W Fisher	324 Pine st
Tuscarora M & M Co	Nevada	6	15	June 26	Aug 2	M E Sperling	309 California st
Vortex M Co	California	1	0	July 12	Aug 1	G W Fisher	324 Pine st
Yellow Jacket S M Co	Nevada	38	100	July 10	Aug 17	Mercer Oley	327 Pine st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Butte Hydraulic M Co	California	4	100	June 22	July 27	L L Deunery	729 Montgomery st
Cahorra M Co	Mexico	1	20	July 26	Aug 26	E A Holmes	309 Montgomery st
Excelsior Deep Gravel M Co	California	12	10	Aug 1	Sept 8	D B Chisholm	327 Pine st
Gopher M Co	Nevada	1	100	Aug 1	Sept 16	Theo Widman	404 Montgomery st
Holmes M Co	Nevada	1	15	July 30	Aug 30	E A Holmes	318 Pine st
Iowa M Co	Nevada	10	50	Aug 4	Sept 4	W M Gillespie	411 California st
Original Keystone S M Co	Nevada	3	50	May 26	June 29	F E Luty	330 Pine st
Peck M Co	Nevada	1	10	July 21	Aug 13	W T Bragg	224 California st
Quartz Mountain G M Co	California	8	100	July 30	Sept 6	E Hestres	729 Montgomery st
Richer M Co	California	4	05	Aug 4	Sept 8	W H Leut	309 Montgomery st
Rowe G M Co	California	1	10	July 8	Aug 7	S D Rogers	328 Montgomery st
Swamp Angel G M Co	California	1	12	June 2	Aug 12	Chas W Badger	315 California st
Utah M Co	Nevada	31	2	Oct 11	Sept 13	G C Pratt	309 Montgomery st
Yuba G M Co	California	10	200	June 19	Aug 2	Edward Lande	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.
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laps the Rex Monti series, and the other rich mines on the north side of Kearsarge mountain, will prove one of the most important mining works in the State.

KEARSARGE TUNNEL.—Supt. Gray has again resumed work, with a small force, in this tunnel. He is running on ledge matter, occasionally striking small spots of the rich blue sulphate ore, which was found in the lower level of the old workings.

MONO.

BODIE DISTRICT.—*Free Press*, Aug. 3: Supt. Taylor's letter of this date shows that the Noonday ledge looks well and is yielding good ore. The pair of new boilers at the boiling works are up and everything connected with them will soon be completed. The additional building at the Noonday mill for 10 more stamps, is well under way of construction.

HOMER CO.—The south drift on the Wasatch ledge shows continuous improvement as to size and quality of ore. The ledge is from 35 to 6 ft in width; samples of quartz assaying in gold give \$2,310.00; silver, \$91.25; total, \$2,401.25.

STANDARD CO.—There is the usual amount of work going on in all parts of the mine. All the ledges on the various levels look good and yield the same uniform good character of ore that has been taken out for some time past. In the north stopes, 350 level, the ledge continues about 20 ft wide, and in the south end the ledge is 7 ft wide.

MCLINTOCK.—The new shaft is now down 502 ft. It will be continued right along, but at the 600 level a station will be cut out and developments continued. The bottom of the new shaft at this station will be about 125 feet from the bottom of the incline, and where there is an 8-ft ledge of ore assaying from \$15 to \$30.

BEVERLY.—The work of handling ore to the Syndicate mill was begun yesterday. It is intended to commence crushing as soon as cleaned up of Standard ore. Forty tons of ore per day are required to keep the mill going regularly, which it is expected to do for some months to come. Much of it is very rich and should altogether add materially to the output of the district.

JUPITER.—For some time past it has been known that a new and interesting discovery had been made on the 500 level south of the Jupiter mines. Early yesterday morning the ledge was reached and found to be stronger and richer than in its original discovery. The ore is rich in both gold and silver, the latter showing both free and leaf-like, as well as in the best form of black sulphates. It also possesses the stain of ruby silver ores, heretofore quite unusual so far north in the district, where almost wholly gold ore has been the rule.

BULLWER CO.—The company extracted and shipped 391 tons of ore to the mill last week from the 200, 250 and 350 levels. In the assays of the pulp average \$14.

GOODSHAW.—An upraise has been made on No. 3 vein of 15 ft. Some very rich ore has been encountered, showing assays averaging \$212.18 from rock taken from all parts of the ledge.

SOUTH BULLWER.—The ledge in the bottom has increased to 6 ft in width, and shows a marked improvement in its value of good milling ore.

NEVADA.

OLD GOLD TUNNEL.—*Nevada City Herald*, July 31: Parties who have been working for some time past on the old tunnel, situated a short distance west of town, have taken out a very good looking rock, which they will soon have crushed. The above-named claim has been worked on and off for quite a number of years, and has at times yielded some very rich paying quartz.

CUMBER.—The recent strike at the above-named mine proves to be very rich, and the ledge from whence the rich quartz is being taken is doubtless the Champion ledge of Cumber. The ledge is from 4 to 6 ft in thickness, and has been crushed, 33 of which yielded \$40 per ton, and 5 tons of assayed rock gave \$140 per ton. The entire crushing of 38 tons yielded 4 tons of sulphurates, which assayed from \$133 to \$140 per ton. The vein, which is 1 ft in thickness, has just been opened. A tunnel was driven nearly 50 ft before the ledge was struck, and is now in about 30 ft on the same.

WATKINS.—*Transcript*, Aug. 7: On Saturday last a ledge was struck on the 300 level, in the north drift of the El Capitán, which prospects very favorably. The ledge is said to be 14 inches thick, and looking well in sulphurates. The specimens exhibited were very favorable to the mine.

THE MORMON CO.—This company has commenced hauling the first 100 tons of ore from the Mohican ledge to the Pittsburgh mill.

INDEPENDENT.—This mine, which, for several months, had not been paying as well as formerly, as was indicated by decreased monthly dividends, has evidently recovered its position. The dividend for the month of July was \$5, and there are indications that the property will continue equally profitable for some time to come, as the ore deposits are steadily improving.

IRON GOLD QUARTZ.—Yesterday a stranger entered our office and showed a chunk of quartz of about 4 lbs in weight that looked as though 1 lb of fine gold had been shot from a cannon and imbedded itself all over the rock. After admiring it for some time we asked where the specimen came from. "I expected that would be your first question," said the stranger, "but as the ledge is a new location, and has not yet been recorded, I shall have to dole out giving on the exact locality at present, but in a short time I will give you full particulars."

OLD TUNNEL MINE.—The crushing of 11 tons of ore from the Gold Tunnel mine, made by Berry & Eddy, realized them \$15 a ton besides sulphurates, which are worth about \$40 more. The boys feel good over their success, and have gone to work taking out another crushing.

ALBERT GRAVEL MINE.—The first clean-up from this mine, situated on Selby flat, miles from this city, was made on Thursday, and from 30 carloads of gravel the owners realized over \$150. This they consider very flattering results, as they have not yet reached the best pay gravel.

SAILOR FLAT GRAVEL CO.—This company has, during the last month, been on short allowance of water, and has not been able to run more than 10 days during that time. They are promised 1,000 inches of water from the South Yuba ditch, either to-day or to-morrow, and then the dissolving of the high gravel banks in their claim will be renewed.

BLUE TENT CO.—North Bloomfield *Cor. Herald*, Aug. 3: The Blue Tent company's mine is running full blast. They have water enough to keep washing until rain falls again, and the general appearance of the mine was never better than at present. Twenty-five hundred inches of water are used in hydraulicking, 3 monitors being kept busy. The company is engaged in running a bedrock tunnel from the South Yuba river, which, when completed, will be in the neighborhood of 1,000 ft long; 500 ft have already been completed.

FORD & McDONALD MINE.—*Grass Valley Union*, Aug. 4: A shaft up 11 ft made of rock on the Ford & McDonald claim, on New York hill, has just been made, and yielded a yield of \$220 per load. Besides this crushing there had been selected from the rock a lot of very rich specimens.

PIETY HILL.—Mr. Fred Brown, who resides on Piety hill, has discovered a ledge in that neighborhood which promises well for the future. The rock prospects good, and a crushing of 10 tons, which has been taken out, will be made shortly.

MOUNT AUBURN MINE.—The reported strike in this mine is fully sustained by parties who have visited it the past day or two. The ledge was small when first discovered, but rapidly widened out until 4 ft thick. The rock shows well, and at this time it gives every indication of continuing to be a rich paying chute of ore.

PLACER.

RICH GRAVEL.—*Auburn Herald*, Aug. 7: We understand that the McCulliverty has struck some very rich gravel in the Dardanelles claim, near Forest hill, and at the close of the water season, which will be very soon, contemplates drifting. Once thoroughly opened up, there are undoubtedly some very rich gravel channels in the Forest Hill ridge.

MICHIGAN BLUFF NOTES.—The old Weske mine is again in operation under the supervision of Wm. Muir. He has about 15 men at work, with good prospects of success. He

is working the mine on a new plan which, it is hoped, will be profitable. The Breese & Wheeler mine is shut down for the purpose of repairing the mill and machinery. The El Dorado mine, at Last Chance, owned by Ray & Highland, is paying very large dividends.

NOTES.—*Dutch Flat Forum*, Aug. 7: We are happy to announce that the construction of a trail to the camps situated on Euchebe bar and Humming canyon is an assured fact, which, at no distant day, will be the great centers of quartz mining in Placer county; and, with easy access to them by roads and trails, these places will rapidly grow into notice and prominence, for the quartz there is very rich. Dutch Flat will be correspondingly benefited.

FRANKLIN MINE.—The Franklin mine continues to prospect well, as does the Shady Glenn. Should these mines meet the expectations of their owners, Dutch Flat will move forward as she perhaps never moved before.

PLUMAS.

BELL MINE.—*Quincy National*, Aug. 7: Work at this mine progresses steadily and satisfactorily, and the mill is running with good results. The rock in the lower level still continues to be very rich, and is being crushed satisfactorily. The rock from the upper stopes is also showing a little better all the time. The mill is paying at the rate of about \$100 per day.

JACKSON MINE.—The same company is sinking a shaft on the Jackson ledge, and is developing a large vein of pay rock. The shaft is 533 ft, and all in quartz, which prospects well and regularly. It is inclined to think that this will prove the best mine in that section when fairly opened. It is large and a perfect vein, prospecting uniformly, and although not wonderfully rich, yet there is plenty of gold to make it good pay, and it is so situated that it can be tapped, by tunnel, at an enormous depth. A run of the Bell mill will be made on Jackson rock before long.

MORRIS QUARTZ STRIKE.—The Susanville parties who came up from Granite basin on Monday, report that Mr. James See made a very important discovery a day or two before, in the shape of a quartz ledge which was literally tilted with gold. We did not learn whether the strike was in the Serrin claim, on which Mr. See has been operating, or something new; but in either case it is important. The quartz is said to be wonderfully rich, and the deposit bids fair to be very valuable. We are glad to hear of Jim's good fortune, as he has been putting in some "hard licks" in that section, and ought to prosper.

NOTE.—Mr. Williams, of Susanville, will soon erect a quartz mill for his own and for custom work, and the chance to have ore crushed, on reasonable terms, will stimulate mine owners there to develop their ledges.

SHASTA.

IRON MOUNTAIN.—*Redding Independent*, Aug. 5: It is reported that Capt. Blaisdell, of San Francisco, has bonded a claim on Iron Mountain (\$75,000) for 60 days, and that he is now on his way to New York on business connected with the Iron Mountain tunnel being run at the mine, and a fine body of ore reported. It is hoped that some action will soon be taken to prove up the value of this reported great discovery.

NOTES.—The Washington company is pounding away on 200 tons of rock, and it will be some time before the grand scrape-up is made. Steve Baker made a short clean-up of this—crushed 1 lb of quartz and got 15 cents out of it. Willey crushed 33 lbs and obtained \$7.57.

SIERRA.

THE 1001 MINE.—*Downville Messenger*, Aug. 7: The owners are still busy opening breasts, and they find better gravel than they expected. The company has a splendid mine, which is certain to contain an immense amount of pay gravel, judging from developments thus far made.

WOLF CREEK.—The Wolf Creek quartz mine has been bonded for 4 months to Dr. Manson, who is already at work developing the same.

AMERICAN HILL.—Wm. Jess is working on a large ledge near the old Von Humholdt, at American hill. The rock shows gold, calena and sulphurates of iron.

NOTE.—The owner of the above mine, who paid well this year, and the owner, who is in Scotland, will receive a dividend of many thousand dollars. John Kendall & Co. are at work opening a claim in the river just below the toll bridge. The water in the river is still very high, but in getting in no difficulty is anticipated. The American Hill company cleaned up last week. The company was unable to clean all their bedrock on account of a slide. We learn that the restaurant, the restaurant, the restaurant has leased the North Fork quartz ledge, and will proceed to prospect it immediately. Some of the rock taken out when the ledge was first discovered was remarkably rich.

TRINITY.

TAYLOR FLAT MINE.—*Weaverville Journal*, Aug. 7: The Superintendent informs us that a recent partial clean-up in the Taylor Flat mine afforded the most satisfactory results, and the ground now being worked give every indication of good pay. As they run back into the flat, the prospects increase and Mr. Walker is confident that the mine has one of the very best mines on the coast. Water holds out well, and it is thought the supply will keep up through the season.

TULARE.

EMPIRE MINE.—*Visalia Times*, Aug. 7: On Thursday evening, Mr. Thomas Fowler brought into town, from the Empire mine, the result of the first working of ore from the Empire mine. The ore is a silver-bearing quartz, weighing 105 lbs. The ore worked came from the 100 level. The strike of rich ore and the production of the silver brick produced an old-fashioned excitement in Visalia.

TUOLUMNE.

TWOA MINES.—*Sonoma Independent*, Aug. 7: These mines are continued to assume that important position claimed for them by the parties who have prospecting in that district. They are down only 5 ft to the Reindoller, and it is asserted by good judges that the prospect for another Comstock is very flattering. The miners and prospectors have established pack-train communication to Crano's flat, where they connect with the main Yosemite Road. Such parties have under consideration a road from the Crano's flat across the divide of 100 ft, which would be in the neighborhood of 30 miles.

NOTES.—The buyers of gold dust in Sonoma report a marked increase of their purchases this year over any previous year since 1870. An air-compressor will be put into the Keltz mine to drive a diamond drill.

NEVADA.

WASHOE DISTRICT.

SASOUE.—Following are the latest official statements to Aug. 10: The raise from the north drift, 1300 level, has been extended a distance of 27 ft. The first 20 ft passed through heavy clay, mixed with quartz and porphyry. For the first 10 ft the rock was very hard, and the same material now in the face of the upraise. On the 5th we completed the 2200 level hulkhead, and stopped the main pump this morning.

OVERMAN.—Incline upraise has been extended 30 ft without meeting any change of ground. Have started a vertical drift hole in zinc to see if we can sink to the 2300 level without striking too much water. This hole is now 75 ft in depth.

CON. IMPERIAL.—The west crosscut south of the south winze, 2500 level, is in 70 ft. We have stopped this crosscut and started one west 100 ft north of the south winze, which has been extended 17 ft. The face of this crosscut is showing a good deal of quartz.

CALADORA.—Diamond drill hole has been extended 50 ft through very hard porphyry; and, having struck a very strong flow of water, we have stopped drilling and plugged the hole.

BEUCHER.—During the week we have cleared up the sump and put up a new donkey pump. We have also cleared out and repaired track, etc., of the 3000 main south drift, preparatory to resuming work in the face. Work on the dump of this drift will be resumed to-morrow.

EXHIBITION.—The diamond drill is in 96 ft. In a northerly westerly direction from the main drift, 2300 level, The formation passed through is quartz and porphyry.

CHERRY CREEK DISTRICT.

TRACUP.—*Cor. White Pine News*, Aug. 1: This mine is opened by an incline to a depth of 770 ft, and shows a continuous vein of fine milling ore of the best grade. It has already produced \$500,000 and has more in sight.

GENEVA.—The Geneva mine has not been opened to any great depth, but sufficient work has been done to demonstrate the fact that they have a strong vein of fair grade ore, and with the expenditure of a small amount of money the Geneva is liable to prove a very valuable piece of property.

NOTES.—Work was commenced on the Box mine last week. The mine is situated on the upper belt, between the Teacup and Chance mines. The Box mine is also on the upper belt and joins the Teacup on the north. Its prospects are first class. Everything is running smoothly at the Star mill and mine. The bullion shipment for the week ending July 23th, was 10 bars, valued at \$8,300.

COLUMBUS DISTRICT.

NORTHERN BRILE.—*True Future*, Aug. 7: The crosscut between the 2d and 3d levels looks very promising, and from it considerable ore of good quality is being taken out. The 6th level is yielding as usual. In the level above the 6th the ore stopes are looking well and promise richly for the future. All work has progressed well during the week, both at the mills and mine. The aggregate output of ore is 104 tons per day.

MOUNT POTOM.—The extraction of ore has been resumed and additional men put on. There are 300 tons of ore at Belleville awaiting milling facilities, and there are also 175 tons in the dump awaiting transportation. The average milling assay of the ore is \$75. The mill at Belleville will be started shortly.

MOUNT DIABLO.—The winze below the 1st level is down 89 ft, and is in high ore. A drift has been started southeast from the drift on the 1st level to connect with the west drift from the bottom of the 1st incline from the old tunnel. This drift is now in 11 ft. The stopes and drifts in ore on the 1st level are looking and producing well.

WATSON.—The prospects of the Watson mine, the sinking of the shaft 9 ft. The total depth of this shaft is now 113 ft. The ore is looking very well.

LUCKY HILL.—Grading for the road to the mine is nearly completed, and the foundation for the hoisting machinery is nearly ready to receive the material.

TINKER.—Work is still progressing on this mine. The ore is looking well, and fair progress is being made.

KEYSTONE.—The prospect of the Keystone mine has been made this week on the crosscut running south.

EUREKA DISTRICT.

EMMA MINE.—*Seaford*, July 31: The owners of the Emma mine have sunk the incline 70 ft, and have uncovered a body of very good ore. They are driving work ahead as rapidly as possible. The ledge is 3 ft wide. Ore assays run as high as \$400. They have an excellent hanging quartzite footwall.

INDUSTRI.—The main shaft of this mine is down 52 ft. A drift has been run from the bottom of the shaft a distance of 95 ft, and is in low-grade ore. They have 22 tons of ore on the dump, and are about to break in the mine.

ORIGINAL BATTLE.—The owners are working vigorously, and expect to strike the ledge of rich ore that was reported some time since. They have found some small stringers of it, and a small cave was discovered.

EL DORADO.—The main tunnel is in a distance of 250 ft, and they are finding some pockets of rich ore, the assays of which average from \$300 to \$400. A drift has been started in a northward direction, and it is expected that in a few days it will open into a body of ore. About 20 tons of high-grade ore are on the dump ready for shipment.

PARADISE DISTRICT.

BULLION MINE.—*Silver State*, Aug. 4: It is impossible at present to give a definite estimate of the extent of the recent strike in the north drift of the Bullion mine. The ore, however, is exceedingly rich in both native and ruby silver, but it will be several weeks before even a comparative estimate can be given of the extent of the ore body. The deposit was encountered in the upper drift, and a drift is being run to strike it on the winze ledge, and if it extends even to that depth the strike may be regarded as the turning point in the history of the company.

NOTES.—We have learned these particulars of the results of the working of the second-grade ore from the Ohio mine, at the Bullion company's mill: The battery samples assayed \$95 to the ton, and the ore worked up to 33 1/2 of that assay by the ordinary wet process.

PHILADELPHIA DISTRICT.

BELEMONT.—*Cor. Courier*, July 31: The mine is steadily improving, as the stopes are extended north and south from the Hogan upraise, showing a continuous vein of good ore. Have driven the stopes north 35 ft, south 15 ft, and are still continuing north and south in end of stopes. Will take out about 10 tons of first-class ore this week and 20 tons of second class.

BARCELONA.—Have been detained 2 days from north level securing up and making necessary improvements. This level continues to look well; ledge well defined and both walls perfect. I will start the Ingersoll drill next week to push north level ahead as rapidly as possible, as it promises a large quantity of high-grade ore.

WHITE PINE DISTRICT.

EBENHART MILL.—*News*, Aug. 7: This mill is of late turning out large quantities of analcam. It is now running to better advantage than at any time since the work of running the tailings was commenced.

SILVER CANYON ITEM.—Perly Rowell, who has the contract for putting up Dr. Brooks' 10-stamp mill at Silver Canyon, left for that place yesterday morning, in company with John McLean, by private conveyance. Work will be commenced at once, and Mr. Rowell expects to have the mill ready to start up by the middle of October at the furthest.

ARIZONA.

YAVAPAI COUNTY.—*Arizona Miner*, July 30: As work progresses in the Silver Prince its marvelous deposit of silver ore becomes richer. A depth of 130 ft. Now at 72 ft deeper a foot of solid ore, assaying over \$2,000 to the ton, is found, while 2 or 3 ft of other metalliferous quartz exists, which assays over \$200 to the ton.

GRON CREEK.—From mining gentlemen from the East who are visiting this section, we are informed that they pronounce Gron Creek district as one of wonderful richness and magnitude unequalled anywhere.

NOTE.—The Golden Era M. Co. think of removing its mill from Cherry creek to the heart of innumerable mines around Gron creek. With improved machinery added to the mill for the proper working of the rich ores of the district, good results must follow to the owners of the mill, as also the owners of the cor.

PRIMA COUNTY.—*Cor. News*, Aug. 7: The prospect of the Prima mine has been made in the Whetstone mountains within a few days. It assays up in the hundreds at a depth of 13 ft.

NOTES.—For a few days the Contention mill has been idle for want of ore, not having had a surplus on hand when the rains commenced. The large ore teams "stuck," but all is right again and the batteries are thumping and pounding away as usual. Prospectors are preparing to take to the mountains. The prospects for water and grass are excellent, and the demand about here for horses, mules and jacks has cleaned out the market. The contractors, Maltor & Lind, have finished the grading for the Sunset mill and, as soon as lumber arrives, commence erecting the mill.

PRIMA COUNTY.—*Silver Bell*, July 31: The upraise in the Ireno is being pushed as rapidly as possible, the entire face still in good shape. The connection will soon be made with the shaft and this will give good ventilation and make room for a large force of miners, which will be put on as soon as convenient. Work will be resumed on the mill, and when finished there will be an abundance of ore on the dump for reduction, thereby greatly adding to the bullion shipments.

TOWNSHIP.—Development on this mine is progressing very favorably. The ore body in the upper drift (to the

southwest) shows a width of 6 ft, and in the lowest shows an increase width of 15 inches. In the last 10 days the upper drift is now 130 ft in length, and the lower 120, and a continuous ore body the entire length of each.

NOTES.—The Silver gulch ore is reported as showing better, and more of it, than heretofore. Our last report stated it as high grade. Some of the ore has been taken to the Mexican mill for reduction. The Cox & Coplin, in the drift, 100 ft from surface, is opening rich, having revealed black sulphides, some of the best of which has assayed \$30,000. Work has been commenced on the Los Angeles group of mines. Hayse & Buck's mine is, indeed, turning out extraordinarily rich ore.

NEW DISTRICT.—We learn from A. C. Webster, who has returned to Globe from a prospecting tour, that he has made valuable locations in an unnamed district. The Sample and Silver Queen claims he regarded as the most noted in that locality. The Sample has a 12x12 foot shaft, 60 ft deep. On the Sample dump there is between 200 and 300 tons of milling ore. The Silver Queen has a 70 ft shaft, 5x7 ft. In this shaft is shown a 2 1/2 ft vein of \$50 free milling ore. The camp has been hastily prospected and many locations made.

COLORADO.

CENTRAL COUNTY.—*Silver Cliff Prospect*, July 31: We were shown a fine specimen of galena taken from the Dora mine near Dora, at a depth of something over 50 ft. It was struck yesterday and looks to be quite rich in silver, and extends over the entire bottom of the shaft without any well rock being struck. The property belongs to the Leavenworth M. Co., and promises fairly by sufficient development to become a very valuable mine.

NOTE.—Parties from the newly discovered Kirby district report many fine prospects in the vicinity. We have over there they located the Fairplay, Criticism, and Emmit claims, carrying galena and chlorides running from 87 to 244 ounces.

CONJOS COUNTY.—*Cor. San Juan Prospector* July 31: The camp of Cornwall is located on the Alamosa creek, 8 miles east of the Summit mining camp, and 17 miles almost due south of Del Norte, in a park 1 mile wide by 1/2 mile long, known as Elk park. The area of the mining locality is, so far as reported, about 10 miles square. The ore of the camp is chlorides and black sulphurates. Prof. Cherry and others say that the ores are free milling—can be reduced for from \$4 to \$5 per ton. The country rock is trachyte. The ore is quite soft and can be easily mined. It is claimed that the veins, in general, are true fissures.

PARK COUNTY.—*Fairplay Plume*, July 29: We are again able to note a good strike on the Mudmill property. For some days it has been improving right along, and since Monday the miners have been taking out a true carbonate ore and sulphurated sand, that encourages the belief that the Mudmill is to become a very valuable property. The lowest assays recently run from 40 to 130 ounces.

NOTE.—The Sacramento company continues to put out the usual amount of ore. The product of this mine alone for but 6 months past has been equal to one-fourth of what the entire mineral product of the county was in 1879. On the Sherwood mine a good thing is said to have been struck. The Sherwood is on the Little Sacramento break-off, not far from the Emma mine. Within a week the owner has opened a body of galena ore which he thinks will run high in silver. A small force of men resumed work on the Crappo mine the first of the week. The owners of this property are getting in shape for some big operations.

IDAHO.

BAY HORSE DISTRICT.—*Idaho World*, Aug. 3: From Harry Lester, who has just returned from Bay Horse district, we gather the following notes: More men are at work in Bay Horse district than in the Yankee Fork country. Two smelting furnaces will be erected in Bay Horse the coming fall. The road was completed from Challis to Bay Horse creek when Mr. Lester left, and they were about ready to take in one of the furnaces, which has been lying at the former place for some time. The other one, which was put up on Kinnickinick, has not yet arrived, but is expected before long.

WOOD RIVER.—We are informed by Mr. Hoskins, who has just returned from the Wood River country, that the mines in that country cannot be surpassed for surface prospects. Whether or not the mines are permanent is yet to be determined, as no great depth has been attained on any of them. Twelve or 15 miles of mines have been made thus far.

YANKEE FORK NOTES.—*Herald*, Aug. 3: The ore sacked for shipment in the Badger mine the past winter is worth from \$700 to \$800 per ton. It will probably go out to the Bay Horse reduction works for treatment. The mine is looking well, and the Badger can be set down as one of the numerous profitable veins of the district. J. O. Fox has commenced sawing and delivering 50,000 ft of lumber to the Cor. Yankee Fork gravel mining company. Grading for the Custer mill-site and work on the two-story office building, is progressing rapidly. Chris. Moler's arastra is running on Badger ore. The mines in this district continue to improve as they are developed.

MONTANA.

DEER LODGE COUNTY.—*Butte Miner*, Aug. 3: The fine show in the Anselmo mine when the drifts were first started east and west at a depth of 75 ft, it has continued to steadily improve from that time, and for the amount of work done has no superior in the camp either in richness of the ores or in indications of permanence. The west drift is now in 60 ft. In the face is a 2-ft body of high-grade ore, the ledge dipping to the south. Only the foot wall is yet visible, but this is smooth and well defined. Recent assays of the ore show it to contain from 250 to 500 ounces, and a 50-ton lot has recently been shipped to the smelter.

STAR WEST.—The main shaft at noon yesterday was down 104 ft, the ore in the bottom remaining about 3 ft wide and showing no change in character or richness. The various stopes and drifts are all in ore, and producing satisfactorily. The shaft near the extreme west end of the claim is now being worked, though the bottom is about 40 ft from the surface, will be extracted as fast as required. The new shaft is 30 ft deep.

GRKY ROCK.—Stopping is actively progressing in the east and west drifts, and a body of ore averaging 10 ft in width, running along the entire length of the level and up to within 40 ft from the surface, will be extracted as fast as required. The new shaft is 30 ft deep.

NEW MEXICO.

SANTA FE.—*Grant County Herald*, July 24: Mining matters in Santa Fe's vicinity are lively. Bonanza City, Carbonateville, Poverty Hollow, Hungry Gulch, Silver Buttes and the Old and New Placers are healthy camps. The vigor, and are now beginning to give some returns for labor and money invested. The camps contain about 800 men. The New York & New Mexico mining company's smelter, of 30 tons capacity, will be in operation in a week, employing already 50 men.

SILVER CITY NOTES.—The Providencia mine, on Chloide flat, is looking first-rate, and the ore taken from it is as good as that from any mine in the district. The main shaft is down 150 ft, another 130 ft, and several others to a lesser depth—all showing good ore.

THE 76 MINE.—There has recently been discovered in one of the crosscuts of this mine a large body of silver-bearing slate, which has caused some of our mining experts a good deal of brown study. Where the tunnel was cut through this slate, in its exposure, it was found to be 24 ft, horn silver is found all through the slate, and in the seams broad sheets of native silver, no thicker than tissue paper, are found.

A MEMORIAL WINDOW, to which Americans have contributed largely, will soon be placed in Canon Farrar's church—St. Margaret's, Westminster, London—in memory of Sir Walter Raleigh.

The Comstock North End.

But little remains to be added to what has been said of operation in the Union, remarks the *Gold Hill News* of the 5th inst. The Union shaft has been connected with the 2500 station of the Sierra Nevada incline. This connection has been made through 30 to 35 ft. of quartz including 20 feet of good milling ore. It is doubtless the heel of the ore body on the 2500 level of Union. The toe is not yet uncovered.

As was said in yesterday's issue, the Union shaft is 340 feet west of winze No. 1. The ore in this connection is 305 ft. east of the parallel of winzes Nos. 1 and 2. It is authoritatively stated that as soon as this connection is retimbered, which will take about a week, crosscuts will be run to connect with these two winzes. One of these crosscuts will doubtless start from the station at the Union shaft and go to winze No. 1. Winze No. 2 is down but 70 ft. and is progressing slowly, as has also been the drift from winze No. 1 south toward winze No. 2. It is not likely that the crosscut for winze No. 2 will be started from the station of the Union shaft but from the south drift. As winze No. 2 is 270 ft. almost due south of winze No. 1, the crosscut for winze No. 2 would naturally be made from some point south of the Union shaft.

Some speculation is extent relative to the hearing the Union strike has on Sierra Nevada. Of course it increases the chances of that mine. In the first place this connecting drift is further north than was that on the 2400 level. Those who are familiar with the situation will recollect that the incline of Sierra Nevada bears a little north of east. Put that bearing at 5 ft. in descending 100 ft. Then the connecting drift on the 2400 level swung out from the incline station south and rounded to the southwest. This made the line of the connection near the incline 20 ft. south of a right line between the Union shaft and the incline station. The connection made last night is therefore 25 ft. at least nearer Sierra Nevada than was the connecting drift on the 2400 level.

If memory serves aright, a drill was sent from the 2500 station of Sierra Nevada north and west something in the direction of the winze sunk from the 2400 to the 2500 level and which started 135 ft. north of the Union. That drill found from 15 to 20 ft. of milling ore, and beyond that again streaks of ore. If this is so, then there is considerable of a prospect on the 2500 level of Sierra Nevada near the Union line.

In whatever light the recent strike of Union is viewed, it is important. It is an agreeable surprise, and indicates a widening of the ore body to the north, as other touchings of the ore formation show it to be reaching out in other directions.

NEW MINING DISTRICT IN NEVADA.—The *Silver State*, Winnemucca, Humboldt county, Nev., learns from Wm. Graves that while down in Churchill county a few days ago hunting stock, he struck a new mining district of which nothing has been said in the papers. It is situated about nine miles east of the Humboldt salt marsh, and is called Bernico district. The prospectors who had discovered the district had just cut one of the ledges at a depth of 85 ft. from the surface, and were taking out some fine looking ore. They had no opportunity to have it assayed, but ore of a similar character found near the surface assayed from \$193 to \$325 per ton. The formation is slate, with ledges of quartzite, lime and graywacke cropping through. The ore is found under a belt of graywacke, with a talc slate footwall. When the ledge was cut the water broke into the shaft at the rate of about 50 gallons an hour. Another ledge has two ft. of ore which assayed from \$30 to \$285 per ton. It is well defined and looks well. The ore channel appears to be under a large graywacke reef which cuts across the low hill. There are other locations which Mr. Graves did not have time to examine. He says there is plenty of nutpine and cedar wood in the vicinity of the mines, and a fine spring of water. The district is about 85 miles from Winnemucca, which is the nearest station on the railroad, and it will be a good camp if it gets into the right hands.

THE LATEST TORPEDO BOAT.—At Saltonett lake, says the *New Haven Palladium*, two representatives of the Lake Torpedo Company, the manufactory of which is located at Hartford, are engaged in experimenting with one of the company's torpedo boats. The boat is a comparatively recent invention, and the object of the experiments is to improve it in a variety of ways. The boat is made of sheet iron, is about 25 ft. in length and 18 inches in diameter, and is pointed at both ends. The motive power is a screw, propelled by an engine which derives its motion from the generation of gas. The course of the boat is directed from the shore or vessel from which it is sent by means of electricity, paying out wire for the transmission of the electricity as it advances. The explosive power is dynamite, of which 125 pounds are used in loading each boat. Boats of this kind have been sold to the Russian government and to the Peruvian government, and some are in course of construction for the United States government.

A THEORY OF THE WESTERN TORNADOES.—Prof. Tice expresses the opinion, that all such whirlwinds as occasionally sweep the Western States are electrical storms, not wind-storms. There was, he said, no wind attending the Marshfield tornado. Among the evidence of the electrical nature of that storm he notes the facts that it destroyed every building which had a tin roof or which had any metal of any kind in its roof. In Marshfield, it passed directly over several buildings with shingle roofs, and tore to fragments others, not more exposed, which had metal roofs. A mill, situated over a quarter of a mile away from the center of the cyclone, had its iron chimney torn out and carried a long distance, while the mill itself suffered very little damage. The cupola of the public school building at Marshfield, which had a tin roof, was wrecked, but the building, which was roofed with shingles, was not injured to any extent. Even more conclusive and remarkable, he thinks, were the phenomena manifested in connection with trees and shrubbery. The bark was stripped from the trees and hushes not alone on those sides exposed to the force of the cyclone, but on all sides. The ends of the branches were not only denuded of their leaves and bark, but were rifted into fine fibers, so that they presented the appearance of little brooms. The active agent in such cases, he insists, was not wind, but electricity. Under its influence the sap under the bark was instantly converted into vapor or gas, expanding 2,000 times in volume, and as by an explosion, threw off the bark, shattered the trunk and split the green tissue into fibers. That this is what took place is, he says, conclusively proven "by the fact that dead and dry limbs and twigs were not affected, and though in immediate contact with green ones, remained intact".—*Iron Age*.

A STRIKING PROJECT.—One of the most striking projects of this day of remarkable undertakings, is that of closing the straits of Belle Isle, which now cut Newfoundland off from the main land on the north. Through these straits pour the icy current from Labrador which greatly reduces the temperature of the Gulf of St. Lawrence and the maritime provinces, and it is claimed that by filling the narrow channel with rock blasted from the adjoining sides, the climate of the gulf region would be raised to that of France. Another argument urged is the possibility, with the straits closed, of building a railway from Quebec to St. John's at the eastern extremity of Newfoundland, from whence the voyage to Great Britain would, it is claimed, require only five days instead of nine or more, the present time from New York. The latter inducement is rather overdrawn, it strikes us. The fogs and icebergs of the Newfoundland coast would still be dreaded by mariners, as now, and the long and expensive rail journey, extending as far north as latitude 52, where for a large part of the year nature is locked in frost and snow, and through a desolate and unpeopled country much of the way, would not be attractive to our people.—*Railway Age*.

A TRAMP TRAP.—It is a well-known fact that freight cars are a great resort for tramps. These cars afford them traveling conveyance, sleeping apartments, and everything which conduces to make the life of a tramp pleasant and comfortable. To hunt them out or to capture them while in these cars has been one of the great studies of railroad men. One of the most prominent citizens of Colorado Springs has invented what he calls a "tramp trap." It consists of an ordinary freight car, in which is a movable bed resting on spiral springs, something like a spring mattress. To this bed is attached a clutch, which acts on an elliptic spring connected with the doors. The movable bed is adjusted so as not to move until a required weight is upon it—say 1,500 pounds, the average weight of 10 tramps. In this car are placed several boxes of crackers, baskets of wine, boxes of cheese, bundles of cigars, and the doors are left wide open. These articles are soon discovered by the tramps, and they begin to swarm around the car and to enter one by one. When the required weight is in the car the bottom suddenly flies up, throws out the clutch, and the doors close quick as a flash and fasten with a spring lock. The tramps are thus secured until the proper officers come and kill the tramps. We understand the inventor has made application for a patent, and the right to use the same will be placed at a very low figure, as he wants to benefit mankind, and not to make money.—*Railway Age*.

MEADOW LAKE GOLD.—We were shown lately, says the *Truckee Republican* of the 4th inst., a small vial of coarse quartz gold which was taken out of some decomposed rock with a mortar. Judging by the quantity shown us, it must have been very rich rock. There is considerable movement among prospectors now in that vicinity. We learn that quite a number of patents to ground will soon be applied for. Parties from San Francisco and other places are becoming considerably interested in the outlook.

At the head of the Animas river, in Colorado, there is a smooth, bare slope of bright yellow rock, the summit of which is 13,200 ft. high. This is California mountain, and on the crowning ridge stands the Nevada cabin, a house above the clouds, built of the yellow rock of the mountain. It was built in 1876. Numbers of mines are now located clear to the summit of this mountain.

Mines and Mining in Japan.

This is the title of a treatise, says *Iron*, published by the University, at Tokio, Japan. There is no more remarkable incident of the century than the rapidity with which the Japanese are adopting European culture and manners. They have now an army in European uniform, a respectable fleet, a university, their towns are lighted with gas, a railway has for some time united the capital with the chief port, other lines are in progress, and telegraphs are extending as rapidly; books, especially translations from foreign works, are called for on every side, newspapers are being everywhere established, engineering, mining and other industrial questions are attracting attention, and suicide has gone out of fashion. The treatise before us constitutes the second volume of the *Memoire of the Science Department of the National University*. It is printed in better style than similar works issued from the Indian or some colonial presses, the title page is in ornate lithography, and the illustrations are respectfully executed by the same process. When Japan was thrown open to the outer world, great expectations were entertained that its mineral resources, especially in the precious metals, would become a prominent object of commerce; as far, however, as regards the metals these are not now likely to be realized, but coal mining, according to the report, promises a great future. The former chief geologist, in his report on the northern island, Yesso, in 1877, estimates the quantity of the then existing accessible coal at about 150,000 millions of tons, an amount which would enable the island, during 1,000 years, to furnish the coal supply at present derived from this country. It is believed that large deposits of coal exist in the other islands also. The native methods of winning metallic ores are of the most primitive description, although not ineffective; and the author minutely describes these and their metallurgical treatment, together with the furnaces and curious implements in use, giving half a dozen large sheet illustrations of the latter. Iron is chiefly procured from magnetic ore, but its production is as yet very insignificant, not more than 4,800 tons a year. There are several causes for this—the cost of charcoal, the fact that coal and iron do not occur in each other's vicinity, the impossibility of large production by the antiquated processes employed, and the fact that for many purposes the native very soft wrought iron is as useless as the brittle hard cast iron. The import of iron into Japan, both in pig and manufactured, is about 12,000 tons annually; but with the probable construction of railways and the bridging over of the numerous rivers, a considerably increased demand for both descriptions may be anticipated.

FISH HATCHING.—A new interest is added to the marvelous industry of fish-hatching by the discovery that Spanish mackerel can be artificially hatched. The *New York Evening Mail* says that Prof. Earle, who made the discovery, prosecuted his investigations in Maryland; and his enterprise is likely to multiply manifold the supply of our markets with this toothsome fish. While five days are required to hatch shad, and from 8 to 12 days to hatch cod, the Spanish mackerel appear 18 hours after the milk and spawn are brought together, and 200,000 to 300,000 can be turned out at one hatching, while only 20,000 to 30,000 shad can be hatched in one hatch. Another advantage is that the spawning time comes about the last of June, just after that for shad and just before that for cod. It is thus possible to provide for each fish in its season without inconvenience, and the Spanish mackerel will henceforth share with the shad and the cod the attention which Prof. Baird and his force give to the multiplication of the piscatorial population of the United States. As it is expected that 100,000,000 Spanish mackerel will be hatched the first year of the enterprise, it seems impossible to conjecture what proportions the industry of fish hatching will yet reach. The advocates of a fish diet for intellectual purposes must take great satisfaction in Prof. Earle's discovery, and if the stocking of our waters with an abundance of fish of the varieties most sought in our markets can improve the mental faculties of the people, great progress in that direction is to be anticipated.

RAILWAY ALARM WHISTLE.—To prevent the chance of a train running past the danger signal during a fog or snow-storm, without the engine-driver seeing it, the Northern Railway Company of France have recently adopted the plan of having a steam-whistle on the locomotive, worked by a current of electricity controlled by the signal. The whistle is connected with an insulated metallic brush placed under the engine; and between the rail there is fixed a projecting contact-bar faced with copper and 7 ft. long, which is swept by the brush when the train passes. This contact-piece is connected to the positive pole of a voltaic battery, the negative pole of which is in communication with a commutator on the signal-post, from which a wire leads to the ground. So long as the signal is at a "line clear," the passage of the brush over fixed contact produces no result; but when the signal is set to "danger," the commutator brings the negative pole of the battery in direct communication with the ground, and on the brush passing over the contact, completes the electric circuit, and causes the whistle to be sounded, thereby alarming the driver.—*Universal Engineer*.

Cash and Credit.

The marvelous thrift of France is attributable in part to the aversion of the people to debt, as well as to their proverbial economy. Public sentiment in that prosperous country pronounces the failure of a person to pay his debts a stain upon the family name, and where such a sentiment exists, there is much caution about incurring pecuniary obligations. One of the great curses of this country is undoubtedly the credit system, which is the parent of nine-tenths of the bankruptcies, and more than anything else causes the poverty of mechanics and farmers. Could the masses of the people be induced to restrict themselves to the pay-as-you-go system, denying themselves whatever cannot be paid for in cash on the spot, the reformation would sweep away half the ills from which the nation suffers, and 20 years hence bankrupts and almshouses would be almost unknown. If evidence in figures of the disastrous influence of the credit system is demanded, let the statistics of Dun, Barlow & Co. be studied, showing that merchants lost in bad debts an average of \$5,000,000 a week during 1878, and of \$1,250,000 a week during the last six months. These figures should burn in the minds of merchants who have adopted the credit system, and they should suggest to consumers the fact that the prices they pay are made large enough to bear a percentage of these bad debts. The man who steps up to the counter with cash in his hand can invariably buy at lower figures than the man who asks for credit. And the trust system is a snare to purchasers, in that it keeps the question of pay in the background until the glib-tongue of the salesman has urged upon the customer articles he did not intend and really is not able to buy. It is thus a prolific producer of extravagance. The fact that in the first half of 1880—a half year in which there were fewer business failures than in any other during the whole history of the country—the loss by bad debts was at the rate of \$63,000,000 a year, should lead people to consider whether prudence does not require them to eschew credit and depend wholly upon ready cash, whether in buying or selling.—*N. Y. Evening Mail*.

A SEWAGE STEAMER.—How to dispose of the city refuse to advantage is a problem in New York which has not yet had a satisfactory solution. The present cumbersome and very expensive method is of the most primitive kind, which must soon be superseded, in the nature of things, by improved appliances. The corporation of Liverpool has adopted a steam dredger which is proven to be a success in every respect, and we have reason to believe it has received the attention of the New York Pilot Commissioners, and others entrusted with the duty of preserving the harbor. The vessel is of 500 tons, 140 ft. in length, 23 broad and 11 ft. in depth, especially constructed for the economical and speedy conveyance of city refuse for deposition in the deep sea. The new vessel differs from the Clyde hopper steamers in having a hull wider at the bottom than at the top and divided into five pairs of tanks, with separate doors to each, the latter with balance weights so as to open rapidly for the escape of material. A pump of large dimensions can be used at will to force any light material through the open doors. This craft is believed to be the forerunner of many such steamers, as it is well calculated to promote the sanitary arrangements of all our seaport cities. It is represented as dredging at about half the cost of the old system—the results such as to "silence all objectors." Of course it is not to be expected that an innovation of this character can be brought about without opposition, for those who handle the city refuse have a very sweet thing as it is, and will not surrender without a protest.—*American Ship*.

SEWAGE FARMS IN GREAT BRITAIN.—The report of the judges appointed by the Royal Agricultural Society to adjudicate the prizes in the Sewage Farm Competition in 1879 has been published. This report shows that there are about 100 sewage farms in operation in Great Britain. Where market gardening is in vogue the gross returns per acre are largest, and also the amount of wages paid per acre. The gross returns per acre for Leamington appear small. This is due to a large acreage of grassland. When, however, the gross returns per head of the population contributing to the sewers are considered, Leamington comes out in a more favorable light; but, here again, the large acreage absolutely increases this amount beyond its true value. A large area of ordinary agricultural land attached to a sewage farm does not always add to its profit. In the conclusion of the report the sanitary aspect of sewage farming is considered. Among the persons either living or working on the farms, the rate of mortality, on an average, does not exceed three per thousand per annum. This, it is added, is a very low rate, but, in all probability, it may not be lower than would be found in an equal number of selected lives, taken from an agricultural district. The result shows that sewage farming is not detrimental to life or health.

FLOODING THE SAHARA.—The prospects of the several projects for flooding the Sahara are gradually proving small and beautifully less, and at present may be said to have been shelved to make way for railway projects from Algiers and elsewhere into Sudan. As there is no question respecting the feasibility of these last named schemes, there is some probability that they may ultimately be executed.

Manufacturing Industries of San Francisco.

Their Value, Number and Employees.

We give below a list of the various manufacturing industries carried on in the city of San Francisco, together with the value of the manufactured articles, and the number of hands employed. The statement has been prepared from the report of Assessor Badlam, as filed with the Board of Supervisors:

Artificial stone factories, 2; men employed, 115; value of manufactures, \$300,000.
 Axle grease, 2; men, 10; value, \$37,000.
 Barrels, 3; men and boys, 175; value, \$211,000.
 Bags, 6; men, women and boys, 207; value, \$1,903,000; number of bags made, 13,107,700.
 Bed springs, 3; men, 25; value, \$18,000.
 Bedsteads, 4; men, 200; value, \$150,000.
 Bellows, 2; men, 12; value, \$32,000.
 Bedding, 7; men, 325; value, \$78,000.
 Billiards, 3; men, 20; value, \$25,000.
 Boot and shoes, 56; men, 2,700; value, \$1,675,000.
 Boxes (wooden), 0; men, 240; value, \$412,000; paper boxes, 5; men, 60; value, \$42,000; cigar boxes, 3; men, women and boys, 144; value, \$110,000.
 Brass foundries, 8; men, 200; value, \$510,000.
 Breweries, 33; men, 310; value, \$2,100,000.
 Brooms, 14; men, 80; value, \$150,000; handles, 2; men, 10; value, \$12,000.
 Brushes, 3; men, 30; value, \$72,000.
 Candles, 4; men, 140; value, \$450,000.
 Clothing, 12; men and women employed, 4,200; value, \$3,150,000.
 Cigar factories, 200; men, women and boys employed, 3,200; cigars made annually, \$2,500,000; cigarettes made annually, 0 000,000.
 Cement pipes, 2; men, 170; value, \$350,000.
 Crackers, 4; men, 130; value, \$1,120,000.
 Chemicals, 3; men, 35; value, \$800,000.
 Cigarage and cigar boxes, 30; men, 180; value, \$330,000.
 Coffee and spice mills, 10; men, 130; value, \$1,107,000; lbs. of coffee roasted, 5,700,000; chocolate, 327,000 lbs.
 Corsets, 4; men, women and boys employed, 20; value, \$15,000.
 Coffins, 4; men, 30; value, \$110,000.
 Cordage and rope, 1; men, 110; value, \$550,000.
 Carriage springs, 1; men, 17; value, \$50,000.
 Cutlery, 2; men, 35; value, \$50,000.
 Dry docks (floating), 2; men, 15; capacity, 2,000 tons.
 Steam docks, 1; men, 6; cost, \$675,000.
 Electric works, 2; men, 40; capital, \$100,000.
 Fringe factories, 5; men and women, 52; value, \$75,000.
 Flour mills, 3; men, 75; 170,000 barrels of flour are made and 40,000 tons of meal, and 5,300 lbs. of Graham flour.
 Foundries, boiler and iron works, 15; men, 1,200; value, \$3,210,000.
 Furs, 6; men, 55; value, \$270,000.
 Furniture, 18; men, 1,400; value, \$1,650,000.
 Gas works, 1; men, 400; capital stock, \$10,000,000.
 Glass works, 1; men and boys, 150; value, \$175,000.
 Glass cutting, 2; men, 18; value, \$50,000.
 Gloves, 5; men and women, 230; value, \$200,000.
 Glass, 2; men, 15; value, \$100,000.
 Gold refineries, 2; men, 50.
 Gutta percha and rubber, 1; men, 9; value, \$16,000.
 Hata, 18; men, 100; value, \$310,000.
 Hose, 5; men, 25; value, \$200,000.
 Harness, 50; men, 350; value, \$100,000.
 Ink, men, 9.
 Ice, 3; men, 350; value, \$90,000.
 Japanning and galvanizing, 2; men and boys employed, 10; value, \$21,000.
 Lead and shot, 1; men, 140; value, \$700,000.
 Lead and smelting works, 1; men, 110; value, \$700,000.
 Laths, 2; men, 10; value, \$22,000.
 Linseed, 1; men, 00; value, \$715,000.
 Macaroni and vermicelli, 5; men and boys, 33; value, \$140,000.
 Marble, 20; men, 220; value, \$550,000.
 Matches, 8; men, 60; value, \$50,000.
 Malt houses, 6; men, 50; value, \$700,000.
 Mirrors, 2; men, 0; capital, \$150,000.
 Musical instruments, 2; men 16; value, \$10,000.
 Oil clothing, 4; men, 20; value, \$10,000.
 Oakum, 1; men, 20; value \$40,000.
 Pickles and fruits, 11; men and women, 1,700; value, \$1,000,000.
 Powder works, 2; men, 62; value \$900,000.
 Pumps, 2; men, 16; value \$90,000.
 Rolling mills, 1; men, 310; value, \$1,104,050.
 Salt works, 3; men, 47; value, \$190,000.
 Safe and vault, 4; men, 40; value, \$60,000.
 Saws, 1; men, 30; value, \$100,000.
 Sashes, blinds and doors, 15; men, 1,400; value, \$4,500,000.
 Silverware, 3; men, 50; value, \$150,000.
 Shirts, 20; men and women, 1,000; value, \$500,000.
 Slippers, 25; men and women, 1,000; value, \$470,000.
 Soap, 21; men, 300; value, \$2,370,000.
 Sugar refineries, 2; men, 200; value, \$6,035,000.
 Tanneries, 43; men, 330; value, \$1,650,000.
 Tools, 11; men, 75; value, \$160,000.
 Type foundries, 2; men and women, 46; value, \$50,000.
 Vinegar, 2; men, 20; value, \$150,000.
 White lead factory, 1; men, 75; capital, \$250,000.
 Windmills, 2; men, 10; value, \$22,000.
 Woodenware, 1; men, 40; value, \$200,000.
 Willowware, 2; men, 8; value, \$6,000.
 Woolen mills, 1; men and women, 700; value, \$1,500,000.
 Wire rope, 1; men, 38; value, \$240,000.
 Wire works, 2; men, 40; value, \$60,000.

A COLD AIR MOTOR.—A novelty in motive power, consisting of an engine set in motion by air combined with steam, is now on exhibition in New Street. The invention consists of an attachment very much like a common air pump by which cold air is forced by the engine into the steam cylinder. The increase in the number of revolutions per minute of the fly-wheel, when this apparatus is applied, over the number it is able to make when the engine is run by steam alone, seems to indicate a great gain in power. A 10-horse power stationary engine is used to exhibit the appliance. The exhibitors claim that with this invention they can do 10% more work on 30% less coal, or in other words, that its use will effect a net saving of 37% in the cost of running an ordinary engine. On June 15th, with 385 pounds of coal, and while using a friction brake weighing 168 pounds, the engine with steam alone caused the fly-wheel to make 18,688 revolutions. On the next day, with the apparatus attached, but with only 270 pounds of coal—all other conditions being equal—the fly-wheel made 20,793 revolutions. For the purpose of thorough inspection by all who may be interested, the engine and appliance will be on exhibition in running order for some time. Engineers are particularly invited to test the truth of the exhibitor's statement.—*N. Y. Herald.*

USEFUL INFORMATION.

Useful Recipes.

To Clean Marble.—Marble, soiled from ordinary use, can be nicely cleaned in the following manner: Pulverize a little bluestone, and mix with four ounces of whiting; add to these four ounces of soft soap and one ounce of soda dissolved in a very little water. Boil this preparation over a slow fire 15 minutes, stirring all the time. Lay it on the marble while hot, with a clean brush. Let it remain half an hour; then wash off in clean suds, wipe dry and polish by quick rubbing. Marble which has become soiled from smoke may be cleaned as follows: Moisten powdered quicklime with a strong solution of washing soda in hot water; brush this over the stone and let it dry. Brush off, wash with plenty of water, and polish with a little tripoli.

Oil Marks on wall paper, or the marks where inconsiderate people rest their heads, are a sore grief to good housekeepers, but they can be removed without much trouble. Take pipe-clay or fuller's earth, and make it into a paste, about as thick as rich cream, with cold water; lay it on the satin gently, without rubbing it in; leave it on all night. It will be dry by morning, when it can be brushed off, and unless an old stain, the grease spots will have disappeared. If old, renew the application.

GREASE on a carpet, if not of too long standing, can be readily disposed of by washing the spot with hot soap-suds and borax—half an ounce borax to gallon of water. Use a clean cloth to wash it with, rinse in warm water and wipe dry.

To Take Out Ink from Woolens.—If ink is spilled on a carpet or woolen article it should be attended to at once while still wet, if possible, and then is very easily removed. Take clean blotting paper or cotton batting and gently sop up all the ink that has not soaked in. Then pour a little sweet milk on the spot and soak it up from the carpet with fresh cotton batting. It will need to be renewed two or three times, fresh milk and cotton being used each time, and the spot will disappear. Then wash the spot with clean soap suds and rub dry with a clean cloth. If the ink has been allowed to dry in, the milk must remain longer and be repeated many times.

LUMINOUS FLOWERS.—Among the elegant novelties of the hour offered for sale on the Paris boulevards are phosphorescent flowers, which glow with a lambent light in the dark, and almost rival their natural tints. They are rendered luminous by coating the petals with transparent size, and then dusting them with a phosphorescent substance, such as Canton phosphorus (sulphide of calcium) or Bologna phosphorus (sulphide of barium). Canton phosphorus is the best, and yields a soft yellow light. According to M. Bequerel, a good quality can be made by mixing 48 parts of flowers of sulphur with 53 parts of calcined oyster shells, and raising them to a temperature of between 800° and 900° centigrade in a crucible. After exposure to sunlight during the day, or to the electric or magnesium light, the flowers thus coated become brightly luminous in the dark.

LEAKS IN GAS PIPES.—To detect leaks in gas pipes, it is recommended to apply soap suds to the suspected leaky joint. The formation of bubbles will show an escape. This is safer than trying the joint with a lighted match. If the leak occur in the branch of a bracket or chandelier, it is repaired by soldering with plumbers' fine solder; if it be a very small one, beat the piece first, with a spirit lamp, and fill the aperture with cement.

THE Pullman sleeping car monopoly is on the wane. It has had its day as an absolute monopolist in this particular business. Many of the leading railway propose to do their own palace and sleeping car business, an announcement that will be hailed with joy by a patient yet long-suffering traveling public.

RAILROAD PATENTS.—Of 279 patents issued during the week ending July 6th, 22 were inventions especially intended for railway use. The number of railway patents issued each week ranges from 10 to 30, a fact which must leave no room for fear that progress in that direction is not keeping pace with other material interests. A large majority of these, however, possess little or no real value.

ODOR OF DINNER.—Most people do not care to inhale the odor of the vegetables which are being boiled for dinner; but in confined city houses it is not easy to prevent the evil. But now a scientific writer authoritatively says that a piece of bread about the size of a French billiard ball tied up in a linen bag and inserted in the pot with the greens will absorb all those gases which disseminate such insufferable odors.

ON THE HALF SHELL.—Mr. K. M. Cunningham suggests a quick way of getting marine diatomaceæ: by taking a peck of fresh oysters and brushing the back of each into a basin of water, this process will give pleurosigma and coccinodisci in abundance.

IVORY that has been spotted, or has grown yellow, can be made as clear and fresh as new by rubbing with fine sand paper, and then polishing with finely powdered pumice stone.

Color Changing Compounds.

The double iodides of silver and mercury and of copper and mercury are perhaps the most remarkable known to chemists in respect to their color sensitiveness when exposed to moderate changes of temperature. They were first described and their peculiar properties pointed out by Meusel, a German chemist. The first is prepared by adding a solution of nitrate of silver to one of iodide of mercury, dissolved in iodide of potassium. The resulting precipitate has a lemon-yellow color, which becomes at once a deep orange when gently warmed, returning again to a bright yellow on cooling.

The copper-mercury iodide, which is still more remarkable, is prepared by adding to a warm solution of iodide of mercury in iodide of potassium some sulphate of copper and then sulphurous acid. The precipitate is a brilliant carmine-red salt which turns brown, and finally an intense black on being gently heated—returning again to carmine on cooling. These changes occur within the limits of 60° and 212° Fahr., and may be easily and strikingly exhibited as a lecture experiment, by mixing the precipitates with a little water (to which some mucilage may be added) and attaching a thin coating of each to a piece of card-board. A number of instructive experiments may be performed with them. A piece of slightly-heated metal, held for an instant in contact with the card, or close to it, will at once bring out an image of itself—a veritable heat-photograph. Many other striking experiments will suggest themselves to our chemical readers.

Messrs. Mayer and Barker have prepared the carmine salt as an application to pillow blocks and other parts of machinery liable to injurious heating, where it will exhibit its characteristic color changes to the eye should any excessive heating take place.

ARTIFICIAL INDIGO.—It is reported that Prof. Bacyer, whose researches in the direction of the artificial production of indigo have made him famous, has discovered a method of obtaining artificial indigo on the commercial scale. The process is reported to have been patented, and the patent has been assigned to the Baden Aniline Co. The indigo is obtained from isatin chloride which in turn is produced from benzole.

TO CLEAN VELVET.—When velvet has been wet and becomes spotted, hold the wrong side oversteam, and while damp draw the wrong side quickly over a warm iron. It takes two to do this—one to hold the bottom of the iron upward, and the second to draw the velvet across.

GOOD HEALTH.

Heart Affections.

There is not a pin's point surface of the external portion of the body which does not give instantaneous warning of the slightest invasion from without: It is our guard against external dangers. But the more important internal organs are so well protected by the casings which surround them, that they do not require such sensitiveness; hence it is not thrown away upon them. For example: It is generally supposed that if the heart is touched we would die instantly. So far from this being true, bayonets and bullets have been driven into the heart of men and animals without causing death. The bullet which caused the death of William Poole was found imbedded in the solid substance of the heart, and yet he lived 11 days after he was shot.

The great Harvey brought Charles II. to a British nobleman who had an opening in his chest, through which the heart could be seen and felt. The king touched it with his finger, but the nobleman was not aware of it, unless he saw the fingers in the cavity. And yet this same heart responds to every emotion of joy, or grief, or passion, or alarm.

Persons often trouble themselves uselessly, about having disease of the heart or lungs, because they have pain thereabouts. These are good signs, generally, as showing that the pains are external to these organs, for there can be no pain where there are no nerves. The fact is, the most certainly fatal affections of these organs give no note of warning by pain, until within the last brief hours of life. The very substance of the lungs and heart are often eaten through, eaten away, without a remote suspicion on the part of the patient that such was the case. The celebrated clerical orator, John Newland Maffitt, died of a literally broken heart—not an emotional breaking, but a structural rupture; it had slowly decayed, rotted away, until so near through that its functions could not be performed, when pain came on, and he died in a few hours; on examination, it was found that this destruction of parts had been going on for months, most probably.

But another result follows the closing of the pores of the skin, and more immediately dangerous. A main outlet for the waste of the body is closed, it remingles with the blood, which in a few hours becomes impure, and begins to generate disease in every fiber of the system. The whole machinery of the man becomes at once disordered, and he expresses himself as "feeling miserable." The terrible effects of checked perspiration on a dog, who sweats only by his tongue, is evinced by his becoming "mad." The water runs in streams from a dog's mouth in summer, if exercising

freely. If it ceases to run, that is hydrophobia. It has been asserted by a French physician that if a person suffering under hydrophobia can be only made to perspire freely he is cured at once. It is familiar to the commonest observer that in all ordinary forms of disease the patient begins to get better the moment he begins to perspire, simply because the internal heat is passing off, and there is an outlet for the waste of the system. Thus it is that one of the most important means for curing all sickness is bodily cleanliness, which is simply removing from the mouths of these little pores that gum, and dust, and oil which clog them up. This it is, also, that personal cleanliness is one of the main elements of health—thus it is that filth and disease habitate together the world over.

The great practical lesson which we wish to impress upon the mind of the reader is this: When you are perspiring freely, keep in motion until you get to a good fire, or to some place where you are perfectly sheltered from any draft of air whatever.—*Hall's Journal of Health.*

Checked Perspiration.

This is a fruitful cause of sickness, disease and death to multitudes every year. If a tea-kettle of water is boiling on the fire, the steam is seen issuing from the spout, carrying the extra heat away with it, but if the lid be fastened down and the spout be plugged, a destructive explosion follows in a very short time.

Heat is constantly generated within the human body, by the chemical disorganization, the combustion, of the food we eat. There are seven millions of tubes or pores on the surface of the body, which in health are constantly open, conveying from the system by what is called insensible perspiration, this internal heat, which having answered its purpose, is passed off like the jets of steam which are thrown from the escape-pipe, in puffs, of any ordinary steam engine; but this insensible perspiration carries with it, in a dissolved form, very much of the waste matter of the system, to the extent of a pound or two or more every 24 hours.

It must be apparent, then, that if the pores of the skin are closed, if the multitude of valves, which are placed over the whole surface of the human body are bent down, two things take place. First, the internal heat is prevented from passing off, it accumulates every moment, the person expresses himself as burning up, and large draughts of water are swallowed to quench the internal fire—this we call "fever." When the warm steam is constantly escaping from the body in health, it keeps the skin moist, and there is a soft pleasant feel and warmth about it. But when the pores are closed, the skin feels harsh, and hot, and dry.

ALCOHOL AND DIGESTION.—According to foreign medical journals, M. Leven has been investigating the question of the quantity of alcohol which should be taken to facilitate digestion, and, consequently, the assimilation of food. He demonstrates, by conclusive experiments, that an excess of alcohol, as 75 grams of brandy to 200 grams of meat, completely arrests digestion; while 25 grams of brandy with the same weight of meat will, on the contrary, have a very powerful effect on the digestion. The quality of the alcohol used is of no less importance. Dr. Rabuteau has studied the comparative action of the different alcohols of commerce with the greatest care. Ethylic or vinous alcohol has always yielded the best results. His numerous experiments show that even an excess of this kind of alcohol does not produce the injurious effects that are brought on by even moderate use of the majority of the alcohols of commerce, and especially of that variety which contains anylic alcohol. According to him, it is this kind which produces the lamentable results of alcoholism.

METALS IN THE BODY.—The human body, which seems made up of flesh and blood, really contains several metals and gases, and other substances which perform important offices in the world of science. Nitrogen and carbon and hydrogen are its chief constituents, but it holds, besides, about two pounds of phosphorus, which is essential to the health of the bones and vigor of the brain. This phosphorus, if extracted and put to use, would make up about 4,000 packages of friction matches. Beside phosphorus, it contains a few ounces of sodium, and a half ounce of potassium, which school-boys know as a curious metal, that burns brilliantly on the surface of water or when touched by an icicle. The quantity of such in the body would be sufficient for many experiments in a large school. In addition to sodium and potassium, there are a few grains of magnesium, enough to make the "silver rain" for a family's stock of rockets on a Fourth of July evening, or to create a brilliant light visible twenty miles away. Who knows but some reckless chemist may undertake to drive a profitable business by extracting these materials from dead bodies?

VASELINE.—Vaseline, or petroleum jelly, is one of the most useful substances for external use ever brought to the attention of the medical profession. Being neutral, bland and unchangeable, as a mere lubricant, or as a basis in the preparation of ointments and liniments, it deserves to supplant all animal fats and oils. And for the toilet, whether alone or in combination with aromatics, for the choicest pomades and soaps, it excels all other substances in elegance and exemption from injurious properties.—*Sanitarian.*



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:
Saturday Morning, Aug. 14, 1880.

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The Week.

The most noteworthy incident in this city during the week was the opening of the Fifteenth Industrial Exhibition under the auspices of the Mechanics' Institute. The usual exercises were held at the Grand Opera House in the presence of a great concourse of our people. The admirable address of President Cornwall, which we print in full elsewhere, sketches the rise and growth of the Mechanics' Institute, the details of which are as interesting as they are remarkable. Hon. A. A. Sargent delivered the oration on "Industrial Progress," a full report of which will appear in our next issue. At the Pavilion in the evening the exhibition opened to a very fair audience for the first night. The display was, of course, in some features, in a state of unreadiness; but that defect is being corrected daily, and the managers are pushing their arrangements for an early and complete exhibition in all the departments. Many agreeable changes have been made in the Pavilion, and besides its great interest to those concerned in business affairs, it daily offers delightful attractions to the young and to the merely curious.

On Wednesday, the 12th inst., Capt. James B. Eads appeared by invitation before the Chamber of Commerce, and gave a comprehensive description of the plan and estimated cost of his proposed marine railway across the Isthmus of Darien. Mr. Eads fairly met every objection to his scheme; contrasted his railway to the De Lesseps canal, and ably maintained the superior advantages of the former. Among other propositions, Mr. Eads stated (1) that a ship railway can be constructed at one-half the cost of a canal with locks and in one-half the time; and (2) that when completed the railway can be maintained and operated at a cost not exceeding that of a canal.

Accounts from the mining regions continue to be satisfactory. Operations in the gravel and placer mines of this State have been generally successful, and at many of the claims the yield of gold has been large. Gold quartz mining has been unusually active all the season, and there are no signs of this interest abating. The revival in mining in this State has reacted favorably on the general business, and this outlook for a prosperous year is excellent.

The situation on the Comstock continues to

be encouraging, although no incident of special importance has occurred since our last. The indications of a coming development at this north end have fortified the waning confidence of the market, and there is a decided feeling that there will soon be an improvement.

Left-Handed Objections.

We agree with the New York *Mining Record* that Mr. Kustel's handbook on the "Roasting of Gold and Silver Ores" is one of "the best known books in American metallurgical literature." Its notices of the little work, however, appears to have been done carelessly, and, what is singular, somewhat hypercritically. In the first place, we may remark that the title of this book is not a "misnomer," for it treats distinctly of the various means and methods of roasting the ores of gold and silver through about two-thirds of its 156 pages. In fulfillment of the promise of the title-page, the book also treats of the methods employed in extracting those metals without the use of quicksilver; there being a chapter on the extraction of silver by the process of lixiviation, and another on the extraction of gold from various combinations of minerals by chlorination. The scope of the work is somewhat larger than its compact title indicates; it might be fuller; but it is neither a misnomer nor misleading. If on opening the book one is surprised at finding a larger measure of information than he sought, the surprise will be wholly agreeable.

There is also an objection to Mr. Kustel's use of the term roasting, which is employed, says the writer, "to cover all kinds of roasting, both with and without salt." Surely the salt of this criticism is without savor. Ores are subjected to either a chloridizing roasting or an oxidizing roasting; in both cases it is a method of roasting, is it not? The book gives a very full account of this process of chloridizing roasting, and an ample one of oxidizing roasting; and in both cases the details of the manipulation are so complete that we cannot imagine how even a reader below the average could possibly "find himself often in doubt or ignorance of what the author means to tell him."

Finally, while the writer approves on the whole of the chemistry of Mr. Kustel's book, he objects to the statement that "the decomposition of superheated steam is a source of heat." What Mr. Kustel says (page 19) in relation to this matter is: In the Hagan roasting furnace "the decomposition of superheated steam is a source of creating heat and a decomposing agent at the same time." Mr. Kustel shows that the Hagan furnace is a shaft or vertical furnace in which the superheated steam is forced directly on the fuel and ore. A large percentage, or all of the superheated steam, is decomposed, and its oxygen combines with the glowing carbon of the fuel and forms carbonic acid and carbonic oxide. This describes the art of oxidizing the carbon; oxidizing means burning; and the burning of carbon creates heat. In reading Mr. Kustel's book we have not discovered that he lays too much stress on the application of steam in roasting silver ores. Nevertheless, we find on page 33 that he offers apparently good reasons for its use under certain conditions. It is to be observed, as Mr. Kustel points out, that considering the percentage of moisture contained in the fuel, there is no roasting done without the presence of a limited quantity of steam. We fail to perceive that the manner in which Mr. Kustel has treated the application of steam in roasting certain ores is in any degree a "hlemish." On the whole, so little has been said by the writer, and that little is so kindly careless, that we accept it as a valid, though not hearty approval of a work of large merit.

JACKSON COPPER MINE.—Mr. D. H. Jackson, the owner of a remarkable copper mine near Walker river, says this *Territorial Enterprise*, has brought into Virginia some very fine specimens of this ore, which yield from 50% to 60% copper. There is a mountain of ore and native bluestone (sulphate of copper) on the surface. From the bottom of a shaft 100 ft. in depth he is now drifting east in a solid mass of ore of the richest character. In his office in this city is to be seen a pile of igneous of pure copper, weighing in all 1,600 pounds. This copper was smelted in a furnace of the rudest description. The Jackson copper mine would create a sensation in the Lake Superior country, where it would probably sell for half a million dollars at the drop of a hat. If we could send all our lead mines to Galena, Ill., and all our copper mines to Lake Superior, we would doubtless do well with them.

ALTITUDE OF BODIE MINES.—Next to the lofty mines of Colorado those of Bodie will take rank for their elevation. We believe they are the highest on the Pacific coast of the U. S. A table of altitudes in Bodie has been compiled by C. L. Anderson, M. E., his computations being in accordance with the formula of the U. S. Coast Survey. From this table it appears that the works of 29 mines are at an altitude ranging from 3,623 ft. to 9,336 ft. The greatest elevation is that of Mount Beidelman, four miles west of Bodie, which reaches 10,336 ft. The theory has been advanced among others, by some New York mining experts, that altitude was a necessary feature of an enduring mine, whether of gold or silver. Accepting this theory, it must be admitted that Bodie fully meets that requirement.

Letters from the Comstock.—No. 7.

EDITORS PRESS:—While it takes but a trifle light as air to knock the market to smithereens, another trifle will infuse a wonderful amount of hackhons into it. Recently a few streaks of ore were discovered on the 2500 level of the Union, and presto! the laggard holders, the faint and weedy dealers, and the sick of heart spring once more into the pool of speculation, and are ready to go in over their heads at the first plunges. The coming upon this ore simultaneously from three sides of a triangle, was as much of an astonishment to the managers as any body. Mr. Mackay, two days before, said positively that there was no prospect there. Your correspondent is of the opinion that this ledge is turned aside from its regular course, and by this turn has eluded pursuit; is a hare doubtless, on its course, and sends this hounds scurrying ahead on a lost scent. Some mighty force, coming down the mountain side, has accomplished this change of formation. One sees signs of the elbow near the incline of the Sierra Nevada, a little north of it, on the 2500 level, but bends to the left looking north. The formation of the upper earth is quite diverse from the lay of the ground anywhere else on the lode. The pitch of the hills is steeper and there is a sort of basin. The depression is very marked, and the ledge does not lie under the slope of the hill, as in the other mines south. What these surface formations indicate is more than your correspondent, who is utterly at sea in geology, can tell; but there is every reason to believe that a convulsion of nature which leaves such pronounced marks on the surface would make its impress lower down. This being the case, the theories which held good south of Ophir would be at fault in the north, and the unexpected encounter with the stringers of ore, and in fact a portion of the ore-body such as found in Union last week, hears out this idea. Prof. Stewart laid considerable stress upon the surface formations of the north end as indicating a broken condition of the ledgs. This was many months ago, and his theories were not generally accepted. Perhaps they will give the old Professor his due when he comes back. It is not improbable that ore bodies will be found in this locality quite distinct from the main ledge, carried by some force a considerable distance, and lying in detached blocks, or, as Dan De Quille very well expresses it, "like plums in a pudding." While cheery indications in Union have traced the north end quite noticeably, there is also a speck of hope in the horizon for Sierra Nevada. On the 2400 level a drill has been run east, and encountered a formation which assays from \$6 to \$18, if the reports are to be believed.

On the 2800 level of the Imperial a crosscut has been started 100 ft. north of the south winz, which is in favorable quartz formation. Work on the face of the Belcher drift has been resumed. On the 1300 level of the Savage, low-grade ore is being found, but in small quantities. With all the indications and theories, however, the knowing ones do not look for a real lively market until the senatorial fight waxes warm. If Fair joins issues with Sharon, stocks will be worth the having. **HAND DRILL.**

BODIE'S BULLION PRODUCT.—The following detailed statistics of the amount of bullion produced in and shipped from Bodie, were furnished to the editor of the *Stock Report* by the agent of Wells, Fargo & Co. The showing is excellent, and is far beyond the general impression of the product of this district. The period embraced in the statement is from 1877 to June 30, 1880:

Standard Con.....	\$4,135,676.94
Bodie Con.....	1,995,657.41
Bedchtel Con.....	71,699.98
Red Cloud.....	10,927.50
Sitting Bull.....	3,485.09
Mexican.....	2,000.00
Summit.....	1,500.00
Syndicate.....	12,316.33
Bulwer.....	341,964.81
Woodward.....	235,232.85
Miscellaneous.....	90,567.37

Grand Total.....\$6,901,008.03

The product of Standard Con., and other mines in the district, since the close of June to date, bring the grand total to upwards of \$7,000,000. This handsome sum has been produced within three years, with a milling capacity during two years of the period of only 55 stamps. The present promise of Bodie is for a largely increased product.

A PROPER INDICTMENT.—At New York on Tuesday, the 10th inst., the Grand Jury in the U. S. Court made a presentment in the case of the steamer *Seawanhakha*, which was burned in the East river some three weeks, the disaster being attended with frightful loss of life. The Grand Jury says it believes the disaster was due to criminal carelessness and negligence on the part of certain Government officials and the officers and owners of the vessel, and attached to the report were indictments against those parties. The offenses charged against them is manslaughter, and hence warrants have been issued for their arrest. Certified copies of the presentment have been sent to the President, the presiding officers of the Senate and the House of Representatives, the Attorney General and the Secretary of the Treasury.

Specifications of the Yuba Dams.

The following specifications of the Stats Engineer for the construction of the dams over the Yuba river are from the Wheatland (Yuba) News:

The upper dam upon the Yuba is nine and one-quarter miles above Marysville. The distance across the river bed is about 4,800 ft. The dam is to be erected eight ft. high above the general plane of the bed, and from four to 12 ft. above the bed, according to its elevation. At each end the dam is to slope upwards until it reaches an elevation of six ft. above the level top of the center. On the north side the end will be set in a bench cut into the rocky point, and both ends will be covered and protected by masses of rock. The dam will consist of a down-stream apron and the dam proper. The apron is placed in an excavation of from four to 10 ft. in depth, and consists of horizontal layers of trees from four to eight inches in diameter and 25 to 30 ft. in length, with the brush still on the trunks, placed with the butts down the stream. The layers are separated by poles and the spaces filled solidly with small brush and with gravel, to the extent of 30% of the bulk of the structure. The poles and layers of trees are to be fastened firmly together with iron spikes or wooden pins. The surface is slightly below the level of the channel. Resting upon its upper edge are trees with the butts down stream, but each layer resting up stream and separated and fastened as described. Resting partly upon the upper edge of this, and partly upon the level of the sand, is the dam proper. It consists of first of layers of trees from 14 to 18 ft. in length, with the butts down stream, inclining at an angle of 45° to the up-stream bed and built up to the full height of eight ft., the exposed butts forming the lower face of the dam and sloping down at an angle of 45°. Upon the rear face of this lie trees from 30 to 35 ft. in length, whose exposed butts form the top of the dam, and whose brushy tops are sunken in an excavation forming the heel of the dam. Finally, upon this is placed either a mass of gravel or of stone fragments. The work is to be done in sections of not less than 100 ft., or more than 200 ft., the excavation in half of each section at least to be complete before any brush is laid. The trees are to be cut below the dam, but at every 500 ft. a belt must be left across the stream as far as it goes. Fascines or bundles of brush bound together with wire may be used where sufficient trees cannot be found within 2,000 ft. of the dams. Bids will be received for excavation, brush and timber ballasting, gravel backing, stone backing, stone weighing and protecting, and earthwork embankment. The second dam upon the Yuba is two miles below the first, and about 9,600 ft. in length. This work is about the same as on the first. The dam on Bear river starts from a point some 200 ft. above the end of the levee at Johnson's crossing. It will be about 6,000 ft. in length. The specifications of the second Yuba dam apply to it completely.

North American Review.

The August number of this substantial monthly presents an interesting and valuable table of contents. The opening paper by the editor on the "Ruined Cities of Central America," will not fail to awaken the liveliest interest of the general reader to know something more of a race which has left behind it such splendid monuments of its vigor and cultivation. Our present knowledge of the remains of a wonderful civilization is derived mainly from the works of our distinguished traveler, John L. Stephens. But the expedition under the charge of M. Charnay, which has already gone to Mexico, promises the most interesting revelations regarding the remains of an extinct race. The earliest accounts from the pen of the explorer, illustrated by engravings, will be laid before the readers of the *Review*. Prof. Profitt's "Law of Newspaper Libel" is a highly critical presentation of the subject under the most enlightened law, and will be profitable reading alike to the professions of law and journalism. Richard H. Dana's "Nullity of the Emancipation Edict" is a curious chapter on the most remarkable incident of the civil war. This paper on the "Principle of Taxation," by Prof. Simon Newcomb is a clear disquisition on a very practical subject. The writer's propositions are stated with nice precision, and his conclusions amount to demonstrations. "Prince Bismarck as a Friend of America and as a Statesman," by Moritz Busch, is fascinating reading. The great Chancellor is one of the remarkable men of the century. The article abounds in bits of home conversations and anecdotes, in which the extraordinary character and glimpses of the very heart of this statesman are revealed. His reverence for royalty and his devotion to the royal State are intensely fervent. His religious belief is as firm as the rock. "I have a firm, unshaken faith in a life after death," he exclaims; "therefore, I am a royalist. Otherwise, I should be a republican." Bismarck's statecraft—his statesmanship—as revealed in his own words, is the very refinement of expediency. This fascinating sketch will greatly raise the reader's admiration for the great German. Congdon's "Recent Literature" offers some very manly and graceful criticism. The *Review* is published by D. Appleton & Co., New York, at \$5 a year, or 50 cents a copy.

James B. Eads.

A Brief Sketch of the Life and Remarkable Works of the Great Engineer.

James B. Eads was born in Lawrenceburg, Indiana, May 23, 1820. In 1833 his parents removed to St. Louis, Missouri, in which city he has since resided. Owing to the financial embarrassment of his father, young Eads was compelled to leave school at the age of 13; but he eagerly took advantage of every opportunity that presented itself to increase his information. His diligence in acquiring facts was remarkable; and when he reached manhood his mind was stored with valuable knowledge. The story of the great engineer's life offers a bright example to our American youth. He essayed to have begun his career with a distinct purpose, and permitted no obstacle to turn him aside from its accomplishment. Denied almost every advantage in his early years, he appears to have formed the heroic resolution to succeed in spite of fortune. He formed a habit of systematic discipline, and acquired that methodical application and persistence which have so sharply accented his riper years. Starting in life without either wealth or influence, it may be fairly said that he was the architect of his own fortune.

Perhaps no living engineer has risen to greater prominence in his profession, nor become more widely known than James B. Eads. For more than a quarter of a century he has been engaged in engineering works of the greatest magnitude, and in every instance his success has been complete and brilliant. In order to satisfy the public interest we propose to give a brief history of his life and works.

Young Eads was employed for five years as a clerk in a dry goods store; but the business was not to his liking. Having great mechanical ingenuity and a decided taste for mathematics, his natural bent was towards engineering; and he zealously devoted all his spare time to the study of that and kindred branches of sciences. At the age of 19 he was employed as a clerk on a Mississippi river steamboat; and while in that position he first began to study the peculiarities of the great river and to consider the means involved in its improvement. As early as 1842 he constructed a divingbell boat, designed to recover cargoes of sunken steamers; and soon afterwards he contrived large boats, provided with novel and powerful machinery, for raising the hull and cargoes of steamers which had gone to the bottom. He succeeded by these ingenious contrivances in recovering a number of large and valuable vessels. The operations of the young engineer extended over the entire river and its principal tributaries; and in this way he became familiar with every part of the Mississippi, and formed the theories which he has since demonstrated with such signal success. From his first step young Eads was remarkably self-reliant; indeed, many of his schemes savored of audacity to older engineers. His courage was dauntless. In 1856 he proposed to remove all the wrecks and snags which obstructed the channels of the Mississippi, Missouri, Ohio and Arkansas rivers, and a bill authorizing him to undertake the work passed the House of Representatives in 1857, but it failed to pass the Senate for want of time.

The advent of 1861 and its tremendous events brought opportunity to the active and aspiring engineer. He was requested by President Lincoln to visit Washington to confer with him as to the practicability of constructing iron-clads of light draft for service on the Western rivers. Soon after this conference Mr. Eads designed and built eight iron-clads having a speed of nine knots. This powerful fleet was completed and fully equipped, and ready for its armament of 107 guns, within the period of 100 days. But the invincible energy of the engineer was commensurate with his splendid ability. These iron-clads were the first war-vessels constructed by the Government, and some of them were engaged in the capture of Fort Henry, more than a month before the memorable contest between the *Monitor* and the *Merrimac*. In 1862-3 Mr. Eads designed and constructed six turreted iron-clad vessels, all of which were heavily plated. The turrets were of novel construction, and their powerful 11-inch and 15-inch guns were worked by steam, and could be loaded and discharged in 45 seconds. This was the first instance where steam-power was used in the manipulation of artillery.

We now approach the period of Mr. Eads' most brilliant achievements. In the interval between 1867 and 1874 he designed and erected the St. Louis bridge, which in many respects has no parallel in the world. In a paper recently read before the British Institute of Civil Engineers, on the "Recent Progress in Engineering," the first place is assigned to that work as the greatest engineering feat accomplished during the last half century. At the time the work was undertaken, grave doubts were expressed as to the practicability of the project, and few men, either in this country or abroad, would have taken hold of so stupendous a work under the circumstances which surrounded it at its inception. It was a supreme task, and it demanded the indomitable perseverance, rare engineering skill, amazing capacity for work, and perfect self-reliance of James B. Eads. He met and overcame every difficulty, and finally, by incessant application and severe work, he accomplished his purpose, and erected one of the grandest bridges of modern times.

The bridge is built of steel. Its central arch has a clear span of 520 ft. and the side arches

have each a span of 502 ft. The piers all rest on the solid rock underlying the river deposits, and two of them are much deeper than any constructed prior to that time. One of these piers, weighing 45,000 tons, was sunk 136 ft. below high water mark, through 90 ft. of sand and gravel; and another, weighing 40,000 tons, was sunk to almost as great a depth.

During the progress of the work many demands were made upon the mechanical skill of Mr. Eads, and many were the devices which he originated and applied in overcoming the difficulties which presented themselves. Among the devices employed were those connected with the construction of the caissons for sinking the piers through the sand to the bed rock. These improvements were afterwards adopted in sinking the deepest pier of the East river suspension bridge.

The arches of the St. Louis bridge were built out from the piers until they met at the center. The half spans near the shores of the river were supported by iron guys passing over temporary towers on the piers and anchored securely on shore. At the central piers the half spans balanced each other, being built out from opposite sides of each pier. The arches are composed of four curved ribs with top and bottom booms formed of steel tubes 18 inches in diameter and strongly braced about 12 ft. apart. As a whole, and in detail, the bridge is a noble and imposing structure.

Mr. Eads had long had in view the project of opening the mouth of the Mississippi river to the commerce of the world. The accomplishment of this project promised enormous benefit to the great Mississippi valley. It was proposed by the United States engineers to

large expenses involved in the canal scheme. The estimated cost of the work was \$12,000,000; it would probably have reached \$20,000,000. Mr. Eads showed conclusively that the canal could not be completed before 1881. He also urged upon Congress the consideration that the canal when completed would afford an adequate relief to the commerce of the river. Finally Mr. Eads made a proposition that was startling in its audacity. He proposed to give an open river mouth to the commerce of the world—a broad, deep, unobstructed channel—for the sum of \$5,250,000; stipulating that not one dollar of this sum should be required of the Government until he had secured a channel not less than 20 ft. deep and 200 ft. wide. This amazing proposition was in direct antagonism to the unanimous recommendations of the U. S. Engineer Corps—a body of men known to be able and eminent in their profession. Mr. Eads not only proposed to depart from long established precedents in engineering, but to assume the enormous financial risks involved in carrying out such a vast public work. The proposition was worthy of the strong, self-reliant engineer.

The result of Mr. Eads' proposal was, that Congress postponed the canal project and appointed another commission of engineers to reconsider the whole matter and report thereon. The new commission comprised three engineers of the U. S. army, three civil engineers and one from the coast survey. This board went abroad during the summer of 1874 and examined many noteworthy works—among others, the jetties at the mouth of the Danube. The board then returned home and made another very careful examination of the mouth of the

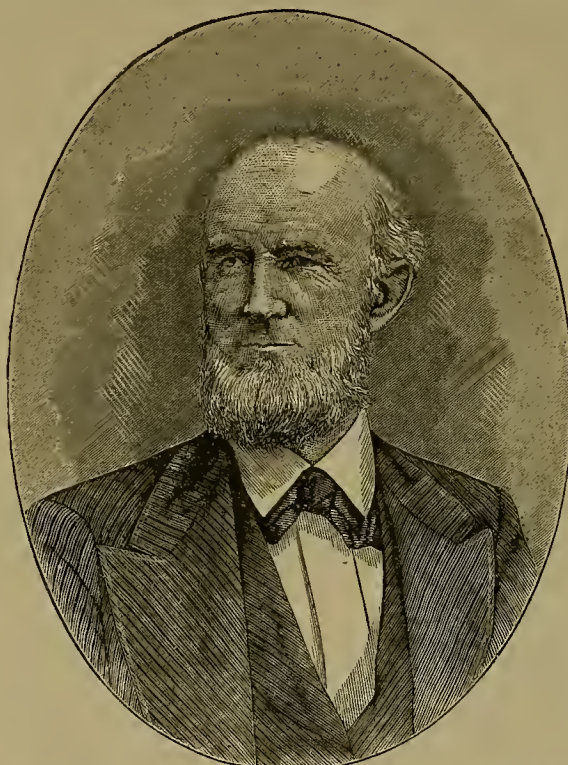
desper and winner over its entire length, and now exceeds greatly the requirements of the law. For securing this harbor entrance—the best from Maine to Mexico—the government agreed to pay the sum of \$5,250,000, and for the maintenance of the channel for 20 years the sum of \$100,000 per annum.

It may be asserted that every theory advanced by Capt. Eads, every statement made by him in relation to the channel which he should secure, has been fully verified by actual results. This project was declared chimerical by the experts of the government in published pamphlets, in written statements, and in verbal testimony before Congressional committees. These ideas were repeated in daily journals and in scientific and engineering periodicals. These opposing views were kept persistently before the public, hampering and jeopardizing the enterprise, and making it necessary to borrow money in order to carry it on at ruinous rates of interest. But Mr. Eads was never discouraged and never for a moment doubted the correctness of his theories. The Mississippi valley and the entire country is indebted to him for one of the greatest internal improvements the world has ever seen.

Latterly Mr. Eads has rendered very valuable service as a member of the Mississippi River Commission; which was created in 1879 by an act of Congress, and charged with the duty of examining the Mississippi and reporting a plan for its improvement. Mr. Eads has long contended that the true plan for deepening the channel is to correct the wide parts of the river by so contracting the high water banks at such places as to create a comparative uniformity of width throughout the alluvial districts. This he maintains will produce a uniformity of depth, and secure at least 20 ft. at low water from Cairo to the gulf. The report of the commission fully sustains Mr. Eads' views, and recommends the application of the principle advocated by him for the improvement of the river.

The last great proposition made by Mr. Eads is the construction of a ship railway across the Isthmus of Darien. He maintains that the railway is far more desirable than the level ship canal project of M. de Lesseps. By his railway Mr. Eads proposes to carry vessels of the greatest tonnage from ocean to ocean in a cradle supported by many wheels and carried on numerous rails. In support of this proposition he made an able address before a committee of the House of Representatives. We have said that audacity was a marked trait of Mr. Eads' engineering schemes; but in this last project of a ship railway, he appears to have surpassed himself. If the project shall ever be attempted, Mr. Eads, of all living engineers, is the man to accomplish it. That would be a lit climax to his splendid career.

In conclusion we will remark that the presence of Mr. Eads in California is full of interest. In 1878 the Legislature passed an act creating the office of State Engineer, and providing for the appointment of two consulting engineers, who were to advise with the State Engineer upon plans for the improvement of our rivers and kindred matters. Gen. Alexander and Col. Mendell were appointed consulting engineers; and upon the death of the former shortly afterwards the vacant place was, by the advice of those most deeply interested, tendered to Mr. Eads. Now that the State Engineer is assisted by such splendid talent, we may look for plans which will lead to the speedy opening of our rivers and the practical settlement of the irksome question of drainage. Our hope rests largely on the great engineer.



JAMES B. EADS, CALIFORNIA'S CONSULTING ENGINEER.

relieve the commerce of the river by the construction of a canal from its left bank, near Fort St. Philip, to Breton bay, by which the bars at the mouth of the river would be entirely avoided. Mr. Eads opposed this scheme vigorously in several pamphlets which he published. He contended that a canal with locks would be inadequate to meet the requirements of the immense commerce of this river. Instead of the canal he proposed the creation of a broad, deep, natural channel through the bar at the mouth of the river, by means of jetties or parallel dikes. Mr. Eads maintained that the effect of the construction of jetties would inevitably be to create such a channel, inasmuch as it would result in bringing the current of the river within narrow limits and greatly increase its velocity, and thus augment immensely the force required to carry far out into the deep water of the gulf the sedimentary matter with which the river is charged. Besides this, the increased velocity of the current would add largely to its scouring capacity. The interest in the vast project extended. In 1872 a commission, composed of seven U. S. engineers of distinction, was by act of Congress charged with the responsible duty of solving the problem; that is, to devise the best means to open the mouth of the Mississippi to commerce. In 1874 this commission recommended the construction of the canal already referred to. This report had its influence with Congress, for a committee of the House unanimously reported a bill to appropriate \$3,000,000 for the construction of the canal as recommended.

It was under these circumstances that Mr. Eads first went before Congress with his jetty project. His knowledge as an engineer, and his extensive knowledge of the Mississippi river, gave strength to the views he expressed. He called the attention of Congress to the

Mississippi. The end of this travel and investigation was, that six out of the seven members of the commission reported in favor of the application of the jetty system as proposed by Mr. Eads. There was, however, this difference between the commission and Mr. Eads: The latter proposed to construct jetties over the bar at the mouth of Southwest pass; the former recommended their construction at the mouth of South pass. Southwest pass was much larger and discharged a greater volume of water than South pass; there was deep water at its head, and it carried 14 ft. over the bar at its mouth. In the case of South pass there were two bars—one at its head with 14 ft. of water, and one at its mouth with not more than 8 ft. These facts show the reason why Mr. Eads preferred the larger pass. Convinced by the clear statements and able reasoning of Mr. Eads, the House committee reported a bill recommending Southwest pass, and it was passed. But when the bill came before the Senate it was amended by substituting South pass for the proposed improvement, and in this form it was passed and became law.

South pass having been forced upon Mr. Eads, he accepted the proposition, closed his contract with the government, and engaged in the vast work. In spite of the supreme difficulties which beset the prosecution of the work during a period of unusual financial depression, the dauntless engineer pressed on. His success was complete and brilliant. On the 8th of July, 1879, he had secured the maximum channel required by the terms of the law, namely: a channel 26 ft. deep, 200 ft. wide, and a central depth through its course of not less than 30 ft. When Mr. Eads began the work there were only 8 ft. of water on the bar, there are now 30 ft., admitting of the passage of the largest vessels afloat. Indeed, since the completion of the work the channel has been gradually growing

LIMESTONE LANDS—Lately a new question as to what constitutes mineral land under the act of Congress has been presented for the consideration and decision of the Land Office. It appears that a piece of land embraced in the area granted to the Southern Pacific railroad contained a valuable occurrence of limestone, which was taken possession of by a person who complied with all the forms required in entering it under the mineral land law. The case was appealed to the General Land Office. The commissioner has decided that it cannot be held as mineral land within the meaning of the law. If the claimant's construction of the law were allowed, then not only limestone, but also sandstone, different kinds of clay and gravels, might be entered under the law, and the title to half of the homesteads in the west would be clouded. The commissioner held that only those lands which were more valuable for the production of the precious metal than for any other purpose could be considered mineral land in the meaning of the law, while the body of land in question, which yielded only limestone, could not be so regarded. If the decision of the commissioner has been correctly reported by the telegraph, it would appear to have been based upon a rather narrow and strained construction of the law, so far, at least, as it concerns the relative value of lands. For example, a tract of land might contain veins or deposits of gold or silver, which might under certain probable conditions be more valuable for some other purpose than the production of either gold or silver; would that state of facts shut it out from entry under the mineral law? We think it would not. In other respects, the decision of the commissioner, excluding limestone, and all other rocks and clays which have a distinctive economic value, appears to be fairly in accord both with the spirit and letter of the law.

One Hundred Years Under Water.

Mr. J. W. Dutton, the constructing engineer of the celebrated Dufferin Palace in Quebec, recently presented a journalist with a cane and a pencil holder made of the wood of the vessel *L'Original*, which was sunk before Quebec in this year 1756. In a letter accompanying his gifts Mr Dutton says:

L'Original was built just below the Citadel, scarcely a quarter of a mile from where Montgomery fell 19 years later. For those days she was a large vessel, but in this age a 1,000-ton vessel is not much to tell of. She was built of oak timber, which must have been brought from France; as none of the Western oak forests had been cut into, it being impossible then to bring the timber down. The vessel was built of the best timber and iron, but she was fated never to do much execution for her country, as shortly after being launched she was sunk, just opposite where she was built.

There she lay until last summer, when she was raised and towed to shore. She sank in September, 1756, so that she had lain under the waters of the St. Lawrence about 123 years. In spite of her long immersion, when they first attempted to raise her it was found impossible, on account of her being sunk in the mud, and it was equally impossible to tear her to pieces as the oak was as solid as on the day she went down. The only thing that was gone was the iron, in those places where it had been exposed, and this had completely rusted away. After several vain attempts to stir her, a diver was sent down, who fired a heavy charge of dynamite under her. This broke her up somewhat, but it was only after many explosions and two years' hard work, that she was finally got rid of.

The wood was eagerly sought for, and now it is almost an impossibility to get a piece of it large enough to make anything of any value. The frigate was the last relic of the old French government, having been built under the superintendence of the Intendant Bigot. She lay in 90 ft. of water, and while she has been there many are the changes that Quebec has seen—as well in manners and customs as in men. When she was removed there were found to be over 100 anchors of all sizes and many hundred fathoms of chain entangled with her. These were, of course, raised, and in some instances claimed, but most of them were sold by the government to satisfy expenses.—*Iron Age*.

AN UNSCIENTIFIC HAT.—Miss Kate Field, discussing the fitness of hats for their purpose, has this to say of the tyranny of the "stove-pipe" in England: It is as much as a man's life is worth—in society—to wear aught but the regulation stove-pipe. There may be M. P.'s who dare to face the Speaker with billy-cock or soft-felt hat in hand, but I doubt it. The only man I ever heard of equal to such an amount of bravery is Joseph Cowen, the member for Newcastle and owner of the radical *Newcastle Chronicle*. He at all times has the courage of his opinions. Whether people agree with him or not, all admire his pluck, a pluck backed by brains. Joseph Cowen would be an orator were it not for a Northumberland burr which prevents him from being fully understood. "Very elegant speaker is Mr. Cowen," once exclaimed Lord Beaconsfield; "What a pity no one knows what he is talking about!" Cowen the Radical, wears a slouch hat, but I should no more expect to see Sir William Harcourt in such a covering than I should expect to see elephants in satin gowns. No one in England who is not a rough or a genius can afford to wear a slouch hat. Alfred Tennyson is rarely seen in anything else. Wilkie Collins and Charles Reade defy public opinion, but I firmly believe that even these men would wear stove-pipes were they daily subjected to the insinuating respectability of the House of Commons. Stove-pipes permeate the atmosphere and play an important part in the legislation. So greatly do they tyrannize over the British male that even Eton boys in jackets are swallowed up by them. Talk about woman's blind devotion to fashion! Did ever woman cling as fondly to crinoline as man clings to his stove-pipe? Never!

A NEEDED REFORM.—The manner of furnishing meals to immigrants while on the way to their Western destinations, says the *New York Times*, having caused much inconvenience and suffering to this class of travelers, the New York, Lake Erie & Western Railroad Company has determined to take the matter under its own management, so far as the immigrants traveling by its route are concerned. The right of furnishing meals has heretofore been let to restaurant keepers. General passenger agent Abbott recently devised a new arrangement for Erie immigrants, which was first tried at Buffalo a few days since. It resulted in such great satisfaction and convenience to the travelers that it will be introduced wherever refreshment stops are made. The immigrants are now allowed the entire freedom of the inclosures at the Buffalo depot, and all outsiders are prohibited from interfering with them in any way. The company furnishes them wheat bread, rye bread, Swedish bread, pies, cheese, bologna sausage, milk, coffee, cigars and tobacco, all of the best quality, at merely the cost of the articles. The immigrants are given comfortable places and abundant time to take their meals in.

A MONSTROSITY.—There is on exhibition at the store-rooms formerly occupied by Jake Heusser, a monstrosity which beats anything that has ever come to this city. It is doubtful indeed, if its like is to be found, search the world over, and the strangest feature of the whole affair is that the curiosity is living. On entering the room reclining on a bed is a mammoth head. That is about all there is to, this strange existence. Its body is small and its limbs can be circled with a band. Its total weight is 70 lbs, its head weighing 45 of them. This monstrosity was born in Worth county, Missouri, on the 26th day of January, 1855, and is now 25 years old, four ft. two inches high, and weighs 70 lbs. His head measures 36 inches around. The organs of speech and hearing are said to be perfect, though this is doubtful. Though uneducated he easily memorizes anything he hears. He also has a splendid musical talent and can sing anything after having once heard it. His head was unusually large when born, and grew to its present size by the time it was two years old, during which time he worried, fretted and cried day and night. Although he has been confined to his bed his whole life, unable to walk, roll over, move his head, or help himself in the least, he has always enjoyed perfect health, never missing a meal; being deprived of exercise, as his situation necessarily places him, he enjoys a good appetite and eats heartily. His limbs are unusually small, which he cannot move except his left hand. He is ever cheerful, ready and willing to answer questions. The head is pear-shaped and repulsive looking.—*Salt Lake Tribune*.

SPECIAL PERILS OF THE WORKSHOP.—Public feeling has been a good deal excited in West Yorkshire by the recent inquiry into the death of a wool-sorter in Bradford, who had died of what is known as wool-sorters' disease, apparently a species of blood-poisoning, caused by the entrance through the lungs into the circulation of a small organism, originating either in the animal which produced the fleece, or during its decomposition, the organisms being sometimes of an animal and sometimes of a vegetable nature. The medical attendant of the deceased said he had seen many cases of this peculiar malady, and it appears that it may be prevented by keeping the fleeces for at least 12 hours in water heated up to 120 deg. Notwithstanding the cause of this complaint is so well known, and the remedy also, it was stated in court that wool known to be dangerous has been placed in the sorters' hands after having been merely rinsed in cold water, and it was deposed that many of these men had been attacked by the disease and some had died in consequence. The jury made a presentment to the effect that proper regulations on the subject should be made and enforced, but this is a matter which properly-minded employers should look to without the necessity of being driven to it by legal enactment. There is a great and unnecessary waste of life and destruction of health in London in this way from want of thought on the part of manufacturers, often in industries in which the workers are very poorly paid.

A RAILWAY ACROSS SAHARA.—To the objections raised by certain explorers, that a railway across the Sahara would be buried from time to time in sand, and that the savage inhabitants of Africa would interfere with the construction and operation of the line, even if it were desirable as a commercial enterprise, its French promoters reply that the inconvenience from sand can be but slight compared with that from snow on many of the American railroads and if it should prove serious, the same mode of protection by sheds can be employed against simoons which is found so useful against winter storms in the Rocky mountains. As to the natives, they will soon learn that passenger trains are not sent to provide them with "meat," and annoyance from them will cease. All this seems reasonable enough, and there is no question that Africa is on the brink of a vast and rapid development. Already the route which Stanley pursued so painfully is practically open to travel, many others are being established, and if we are not mistaken railway supplies have recently been shipped to Zanzibar for use upon the continent. We confess to personal disappointment at seeing the prospect of Saharan sea fade away. To say nothing of the amelioration which it was expected to work in the summer climate of Southern Europe, the thought of having to traverse the desert by land instead of water, even in a railway car, has little that is attractive.—*American Architect*.

FIRE ON A RAILWAY TRAIN.—The Battle Mountain (Nev.) *Register*, of July 31st, says that on the down trip from Austin last Tuesday, when the train was a short distance this side of Mound Springs, it was discovered that one of the box cars containing wool was on fire. An effort was made to put out the fire, but as it had gained a good start before being seen, all attempts to subdue it were futile, and the car was run on to the side track at Bailey's station and left to burn. The wool belonged to P. Duffy, and was being shipped to this place for sale. It was valued at about \$1,600, and was a total loss. The car cost \$800, and will be almost a total loss to the company, as nothing remains except the charred wheels, so that the Nevada Central's loss will foot up nearly \$2,400 on this accident. It is supposed to have caught from a spark from the locomotive.

AN ANTIQUATED CITY.—A correspondent of the *Boston Traveller* makes this interesting mention of Cordova, once the capital city of the Mahomedan empire in Spain, and at one time the favorite shelter of learning when Europe was sunk in darkness and barbarism, is located on the river Guadalquivir, and has a population of 43,000. The wall surrounding the old Moorish town is flanked with square, round and octagonal towers; however ancient, it is all kept in excellent repair. Seldom is a city found having a finer location, encompassed by a magnificent plain, with lofty blue mountains in the distance, and at one side, not many miles away, are luxuriant hills, whose precipitous sides are dotted with abbeys and monasteries. Their massive white walls and domes reflect imposingly in the sun, as seen from the promenades lined with magnolias, that are outside the city walls. No other city in Spain, to my mind, presents so singularly decayed an appearance as Cordova. There is a charming quietude in wandering through its narrow, winding and clean streets, mostly paved with small round stones. But few carriages are in the city, which evidently from the first was not intended for such, most of the streets being too narrow to admit them. Saddled horses and donkeys can, however, pass almost anywhere, but only occasionally are they seen in other than the market places and broader thoroughfares near the limits of the town. The houses are two stories in height, of stone or brick, and mostly white; some are painted blue or yellow, all having small inner courts with neat little fountains in the center. These fountains are of different designs, with constantly-playing water, and present a most cheering appearance, surrounded as they are by small orange and lemon trees, and seen by the passers-by through the iron-latticed doors and windows.

NATURE'S SILVER PLATING.—Lately a reporter of the *Gold Hill News* was shown some very peculiar specimens from the Lord of Lorne mine in the American Flat section. They were from the foot and hanging walls of the ledge, and on the sides next to the vein were covered with a thin film or natural plating of pure silver, as smooth as glass. The vein itself is narrow, and is being prospected by means of a tunnel running south. Mr. McDougal, the Superintendent, says this peculiar feature of the enclosing walls is observable throughout so far as the tunnel has followed the ledge. The ore of the vein itself is of a soft, easily-worked nature, showing considerable chloride as well as sulphurets, yet not giving very high assays. The filmy deposit of silver on the walls was evidently condensed and forcibly deposited there under immense pressure, as it has a smooth, burnished appearance, with strong, vertical erosions. It is quite a curiosity.

COAL OIL MONOPOLY.—We have often referred to the virtual monopoly which the Standard Oil Company has of the refining of petroleum. Several years ago they succeeded in buying up or leasing nearly all of the oil refineries in the country, and within the past week they have bought two of those remaining, leaving but one at Pittsburg out of some 30; and of all the refineries in western Pennsylvania, there are but four others in the oil region that are not controlled by the Standard. It is also reported that they have "fixed" the New York independent refineries and the Tide-water Pipe Line, and that they now propose to put crude oil up from \$1 a barrel—where it has been for some time—to \$3. Whether this latter is true or not, there is a firmness in the oil market that cannot be explained on any reasonable basis of demand and supply.—*Iron Age*.

A MINE has been discovered somewhere near the head of White river, a distance of about thirty-five miles from Delano, Kern county; out of which a sufficient quantity of gold and silver ore has been extracted to give a good general idea of its merits, the result being as follows: Gold, per ton, \$5; silver, \$235, and copper, 7½%. Besides this, the vein is three ft. in breadth, runs north and south, and pitches at an angle of 45 degrees west.

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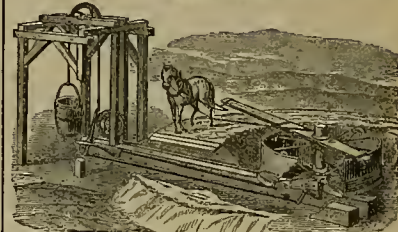
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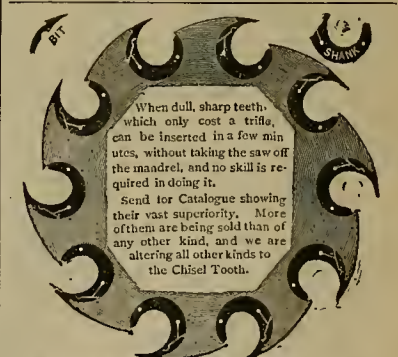
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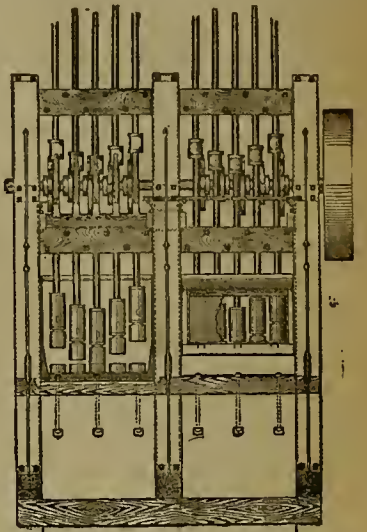
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports (or the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.)

FOR THE WEEK ENDING AUGUST, 3d, 1880.
230,764.—WHIFFLETARE—F. O. Fischer, Aptos, Cal.
230,765.—PICTURE HOOD—J. T. Haviland, S. F.
230,774.—STREET CAR—W. N. Hawley, S. F.
230,712.—SHEEP SHEARS—D. E. McKee, Potter Valley, Cal.
230,650.—FISHING ROD—J. S. Niswander, Oakland, Cal.
230,820.—EXPLODER FOR BLASTING CHARGES—W. S. Rosecrans, S. F.
230,837.—HEATING FURNACE—J. L. Trefren, Santa Cruz, Cal.
230,839.—LANTERN—E. R. Tutt, Ukiah, Cal.

List of Patents issued in Victoria to American Inventors from January to June, 1880:

2,780.—ELECTRIC LAMP—T. A. Edison, Menlo Park, N. J., Jan. 30, 1880.
2,789.—CONSTRUCTION OF SHIPS—Z. Oram and P. B. Grove, Philadelphia, Pa., Feb. 14, 1880.
2,793.—RAILWAY CROSSING—J. S. Williams, Riverton, N. J., Feb. 21, 1880.
2,800.—RAILWAY SYSTEM—P. Hettner, Philadelphia, Pa., March 10, 1880.
2,802.—ELECTRIC LAMP—T. A. Edison, Menlo Park, N. J., March 13, 1880.
2,804.—RAILWAY SWITCH—J. S. Williams, Riverton, N. J., March 13, 1880.
2,805.—MANUFACTURING GAS—H. V. Attridge and W. Farmer, New York, N. Y., March 31, 1880.
2,809.—MACHINE FOR POST-MARKING STAMPS—Thos. Leavitt, Everett, Mass., April 5, 1880.
2,810.—HARVESTER—O. S. Ellithorp, Chicago, Ill., April 5, 1880.
2,812.—APPARATUS FOR GENERATING HEAT, ETC., FROM OIL—Charles Holland, Chicago, Ill., April 13, 1880.
2,814.—CHLORINATING ORE—J. H. Meers, Philadelphia, Pa., April 14, 1880.
2,820.—EXTRACTING METAL FROM ORE—J. A. Robertson, Oakland, Cal., May 4, 1880.
2,832.—TELEPHONE—T. A. Edison, Menlo Park, N. J., May 4, 1880.
2,838.—ICE MAKING—C. C. Palmer, Oakland, Cal., May 18, 1880.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

COMMISSIONER'S DECISIONS.

Manufacturer of Oil-cakes.

Ex parte McDougall. Appeal from Primary Examiner—Decided, June 14, 1880.

1. The rule that several distinct inventions cannot be included in a single application is applicable whether such inventions be improvements in processes or machinery, and the mere circumstance that several processes pertain to the same subject-matter, will no more warrant their inclusion in a single application than will the bare fact that two machines are in the same class of invention warrant the issue of one patent for the two.

2. Although each of the several "acts" of the "series of acts," constituting a process may be capable of performing separately its own peculiar function, and may be used independently of the others, yet if they all contribute in producing the final result they must be joined in a single application, and a claim may be made to the entire process, and separate claims can also be made to the sub-processes, which go to make up the same.

3. When one has discovered that a desired result can be attained by a process consisting of a series of steps, and that certain of the steps in such process can be replaced by others which will operate in an equivalent manner, a broad or generic claim can be made including all the modifications, and a more limited or specific claim can be made to any one of the modifications.

4. Where in several processes the order in which the several steps follow each is different, as are also the final results attained, the processes cannot be said to be modifications each of the other.

5. Alternative claims and claims for modifications condemned. The mere fact that courts, in order to save a patent, have sustained such claims is no warrant for the Office to shrink its duty in requiring that the claims shall be framed in the clearest and best form, and shall not embrace distinct inventions.

Decision of the Examiner confirmed.

ACTING COMMISSIONER'S DECISIONS.

Improvement in Refrigerating Cars.

Booth vs. Lyman et al. Decided July 2, 1880.—Appeal from Examiner of Inferences. Stockbridge, Acting Commissioner.

1. The *prima facie* date of invention of a patentee in an interference is the record date of the filing of the application upon which the patent was granted, and the mere allegation that certain records of this Office establish an earlier date cannot, without some connecting link in the application, give a different record date.

2. Such records, when properly introduced in evidence during the period assigned for taking testimony, may well be relied upon for what they are worth; but the adverse parties are clearly entitled to an opportunity to introduce evidence to rebut the same.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

HEATING FURNACE.—John L. Trefren, Santa Cruz, Cal. Patented August 3, 1880. No. 230,837. This invention relates to certain improvements in air-heating furnaces, such as are used for furnishing heat to churches, halls or private dwellings. The fire-box, or box stove, is made of corrugated iron castings, which gives it a great heat-generating power, and it is inclosed in a heating chamber; outside of this chamber is another chamber, and outside of this again are the outer or inclosing walls, forming another chamber. Each of these chambers opens into a central one above. When only

one or two rooms are to be heated, the supply of air to the outer chamber is cut off, and it then answers as a sort of jacket to the central chamber and prevents radiation of heat. A heater constructed in this manner is very economical in fuel, and a comparatively short time only is required to generate heat.

SHEEP SHEARS.—David E. McKee, Potter Valley, Mendocino county, Cal. Patented August 3, 1880. No. 230,712. This invention consists in interposing between the hinged handles a supplemental hand-lever hinged to one side of the handle, and having a swinging link or arm hinged to the other side of the handle, a spring being provided to throw the hinged handles open. What is known as the "hand-hold" is not so wide as when both sides of the handle have to be grasped, and the work of using the shears is materially reduced.

EXPLODER FOR BLASTING-CHARGES.—W. S. Rosecrans, S. F. Patented Aug. 3, 1880. No. 230,820. This invention consists of an exploder formed of a tube of metal capable of holding the enclosed powder, when ignited, under considerable pressure, in combination with a powder filling incapable of explosion except when ignited within a case capable of holding it under pressure; and, second, it consists in the peculiar manner of holding the fuse within the tube and the exploding powder under pressure.

STREET CAR.—Walter N. Hawley, S. F. Patented Aug. 3, 1880. No. 230,774. This car consists of three longitudinal compartments, the outer ones of which may be sub-divided into as many sub-compartments as may be desired by transverse partitions, while the central compartment forms a narrow continuous passage from end to end of the car. The side compartments are closed in and provided with windows, and each side compartment can have a central door-opening for ingress and egress.

PICTURE-HOOK.—John T. Haveland, S. F. Patented August 3, 1880. No. 230,701. This invention relates to certain improvements in that class of devices known as "picture-hooks" or "hangers," and it consists in the combination with a curved plate, hook or hanger, on a roller or pulley, over which the supporting-cord passes, and which, by turning freely upon its axis, allows the picture to be adjusted to hang freely.

The Opening Address of P. B. Cornwall, President of the Mechanics' Institute.

The opening address of the Fifteenth Industrial Exhibition of the Mechanics' Institute, was delivered by Mr. Cornwall, President of the Institute. It was well received by the large and appreciative audience. Mr. Cornwall spoke as follows:

Custom has served to make it necessary for the President of the Mechanics' Institute to deliver a brief inaugural address at the opening of each industrial exhibition held under the auspices of the Institute. We have met here to-day to conduct the preliminary exercises incident to the opening of our fifteenth exhibition at the Pavilion on Eighth, Market and Mission streets. The first meeting of the mechanics of San Francisco for the purpose of organizing the association now known as the Mechanics' Institute, was held at the office of the Tax Collector in the City Hall, on the evening of the 11th day of December, 1854. G. K. Givens presided. The committee appointed for the purpose reported on the 6th day of March, 1855, a constitution, which was adopted; and on the 29th day of March, 1855, a permanent organization was effected, with Benjamin Haywood as President. On the 24th day of April, 1855, the proper certificate was filed in the office of the County Clerk, by which the Institute became a body corporate under the laws of the State.

At the end of the first year of the existence of the Institute, March 5, 1856, there had been expended \$1,106.86, and a balance of \$21.49 remained in the treasury. Two hundred and eighty-two members were enrolled, but only 92 had paid their quarterly dues. The library consisted of 457 volumes. During the succeeding 10 years the Institute struggled on bravely, occasionally holding a fair, with varying success, but always making valuable additions to its library. From 1866 to the present time the Institute has steadily increased the size and improved the character of the library, and in other ways enlarged its ability to do good. At this time it is possessed of unincumbered property valued at about \$257,000, with no indebtedness except about \$3,000 unpaid taxes. The library contains 29,000 volumes, of which 14,000 compose our reference library, which is undoubtedly the most complete and valuable collection of scientific works on this coast. It is but just for me to say here, that for this remarkable progress, and for the successful establishment of the Institute on a firm and secure basis, San Francisco is more indebted to the intelligent and unselfish labors of Andrew S. Hallidee, who was its President and leading spirit for many years, than any other person.

Among the things now in contemplation by the patrons and friends of the Institute to increase its usefulness, is the establishment of an apprentices' department, where regular and frequent meetings of apprentices may be had for the purpose of investigation and debate upon mechanical and other subjects, and the institution of a system of lectures and classes for technical education, where skilled workmen and learned teachers may explain the methods by which the hard things of life are made easy, the confused clear and the doubtful certain. By these and kindred means, the increasing thousands of idle youth growing up in this city, many of whom, because of idleness, are drifting into vicious ways, may be diverted into channels of intelligent mechanical industry, and grow into useful and respected citizens, with happy homes, thus adding to the aggregate wealth and prosperity of the country. It has been said by some who object to this course, that there is no room for more mechanical labor here, that the market is over-stocked; and that we cannot successfully compete with mechanical products shipped from the eastern side of the continent, because labor there is cheaper. I have sometimes thought that this difficulty lay more in the indifferent way in which many of our manufactories are conducted, and in the absence of those close and systematic economies, which are essential to success in all manufacturing enterprises; and I have observed, that in most instances where by patient, intelligent labor and skill, the highest excellence has been achieved by the San Francisco mechanic, he has driven out of the market the kindred wares of Eastern or foreign product. It is true that, owing to our comparatively isolated position, the mechanics of San Francisco have heretofore been practically limited to California, Oregon and Nevada for a market in which to compete for the sale of their products, but by the building of the Southern Pacific railroad into Arizona the field has been greatly enlarged, and the proposed extension of the Southern Pacific and connecting roads into and through Mexico will soon open up a vast and productive field for enterprise, into which the industrious mechanics and resolute manufacturers of San Francisco can send their machines and wares for successful competition and sale, if they are so made and finished as to do credit to their craft. There is in the minds of many persons a prejudice against their sons being apprenticed to and educated as mechanics. I believe it is all wrong. What has mechanism done that such prejudices live? Without the mechanic the world would never have emerged from barbarism. Without the mechanic no ship would have been built in which the hold mariner could sail and discover America. The ponderous engines that drive the steamship through trackless oceans; the finest lace that is woven for the infant's couch; the houses we live in; the books we read; the clothes we wear; the table at which we sit; the plates from which we eat; this beautiful temple in which we are gathered, and all of our comfortable and ornamental surroundings here and at our homes are the products of intelligent mechanism. I believe that there is a greater proportion of useful men with happy homes among mechanics than in any other class of life, not excepting farmers.

A thorough education in any branch of mechanism does not prevent the possessor thereof from entering any of the other walks of life which may afterward seem useful and pleasant to him, but is an additional qualification for success in almost any private or public place—happily in this country there is no place so high that the humblest child or man may not aspire to it, and with studious habits, pure life and resolute determination, he may reasonably hope to succeed in writing his name high on the roll of fame. The history of our country is full of such achievements. I need go no farther for an example than point to the trained and skilled mechanic who is to deliver the oration to you to-day, who rose step by step from the printer's case to the Senate of the United States, where he was the peer of any man in that greatest of all deliberative bodies. Let us not then be afraid to educate our sons to be mechanics, but let us rather take care that the rising race of manufacturers grow up better skilled in mechanics, better repented for quality of materials, and more discerning in matters of taste. Then shall we do well for our fellow men and help to continue and increase national prosperity.

MANUFACTURING IN RUSSIA.—A recent report from the German Consul-General at Moscow, gives some information concerning the manufacturing industries of Russia. There are about 15,000 factories in the empire, producing goods to the value of 500,000,000 roubles (\$325,000,000) a year. At Moscow the wholesale trade is almost entirely in the hands of Germans—that is, either Russian subjects of German origin, or subjects of the German empire. Among the manufacturers, on the other hand, the Russian element predominates. Imported goods, which formerly came chiefly from France, are now almost entirely of German production; year by year the French imports are diminishing, while the German imports are increasing.

STURDY STOCK.—Senator Hamlin, of Maine, is thus described: He has never known sickness, and has been most careful and attentive to his public duties, of whatever character, of any man in the country. He never wore a piece of flannel, or underclothing of any description, a pair of gloves, or an overcoat. Even in our coldest weather, Mr. Hamlin, even at his advanced age, plods along, dressed in the coldest of costumes—the old-fashioned swallow-tailed coat—without wraps of any kind, while his fellows are almost frozen to death beneath his overcoats and the heaviest of underclothing. His power of endurance is wonderful, and his capacity for work great.

News in Brief.

OVER 400,000 Texas cattle have been driven into Kansas this season.

BERMUDA grass is valuable to bind ditch banks and levees against the force of a current. A PLUMAS hunter shot nine deer during the past month, one of them weighing 170 pounds. In the English census the champion name is "Hostiliana Ophigenia Maria Hyphile Wage."

ON a recent trip of one of the White Star steamers \$400 were collected for the Sailors' Orphan Home.

WILD strawberries, swet, luscious and plentiful, cover many acres of the meadows near Donner lake.

RUSSIA has ordered the construction of tan clippers, five of which are to be built in the United States.

THE couple arrested as the notorious Benders are pronounced by the people of Kansas to be frauds and beats.

ONE of the features of a voyage on the French steamers is the gratuitous distribution of very good table claret.

WHEN a school of black fish appears off a Cape Cod village, all rush to the capture, even though at church.

NEW YORK is treated to a greater variety of offensive smells than any other settlement on the face of the globe.

BERLIN has now a club composed of the English and American residents of the city. It is said to be successful.

MR. FROUDE was among those who strongly opposed the Westminster monument to Louis Napoleon from the first.

MANY of the so-called club-bouses at the fashionable summer resorts are no more and no less than gambling-houses.

By a railroad accident near Waverly, O., August 7th, David Dungan was killed and 15 persons were injured.

OF THE eight steamers now in the service of the American line of Philadelphia, four are English built and named.

THE hogs in the vicinity of Angels, Calaveras county, are attacked by a throat disease, which is proving very fatal.

MORE British troops are ordered to Ireland, in view of possible disturbances growing out of the enforcement of the land laws.

REV. W. H. H. (ADRIAN) MURRAY is reported to be engaged in a large and profitable commission business in Liverpool.

Boston Methodist preachers have petitioned the municipal authorities to abandon free concerts in the public parks on Sunday.

J. McDONALD GARDENER, a Connecticut teacher, is going to Japan as professor of English literature in a high school at Tokio.

THE British have 40,000 troops in Afghanistan. The recent battle between Burrows and Ayoub Khan was fought near Hyderabad.

ONE result of the elections in Mexico is that not a deputy who voted to delay the passage of railroad bills has been returned to his seat.

A STANISLAUS county thresher recently threshed 9,016 bushels of wheat in three days and three hours, with the usual stoppages.

THE increase of alleged French flats in New York is remarkable. Several dozen are now being erected in the upper part of the city.

THE family of Phelim Toole, the fireman who was recently killed in St. Louis, have received over \$7,000 by subscription of the citizens.

THE first woman ever ordained to the Christian ministry in Europe is Carolue A. Soule, who is a Universalist preacher in Scotland.

MR. BRETE HARTE, our Consul at Glasgow, has become a regular contributor to the *St. James Gazette*, the new London newspaper.

NATURAL caverns of large size, one, at least, being 600 ft. long, have been discovered at West Hartree, near Wells, Somersetshire, England.

A CUBAN family at one of the Saratoga hotels has a weekly board bill of \$450. This is for 6 adults, 3 children, 2 maids, coachman and valet.

A PETITION was recently presented to Parliament from the British Medical Association, signed by 7,000 medical men, against vaccination.

THE British have received another good drubbing in Afghanistan, losing ten men and the greater part of their baggage, animals and treasure.

IT is told of a monkey who had suffered from a toothache for several days that he tied a string to the offending tooth and pulled it out with a jerk.

A GERMAN newspaper claims to have discovered that Goethe was descended from a Bavarian family, bearing the name of Gotze, and living in 1449 at Henstren.

THE American and English Bible Revision Committee are said to agree in 99 cases out of 100. Work on the New Testament will be finished in September.

LEWISTON has \$590,070 invested in 78 factories, outside of cotton and woolen, which pay 1,256 persons \$296,277 a year for making \$1,263,968 of products.

A BRAKEMAN on an Indiana freight train, who permitted a man to ride with him on the top of a car, undertook to collect fare, and shot the passenger for refusing to pay.

THE Countess of Cork recently gave a "rose hall" in London, the house being filled with roses, and all the guests adorned with roses of all imaginable sizes and shades.

TWO hundred Cherokees are assembled at Fort Gibson ready to attack the Creeks unless the latter surrender 13 Creek negroes who attacked a party of Cherokees and killed two of their number.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Boltho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

HALL'S VEGETABLE SICILIAN HAIR RENOWER is a scientific combination of some of the most powerful restorative agents in the vegetable kingdom. It restores gray hair to its original color. It makes the scalp white and clean. It cures dandruff and humors, and falling out of the hair. It furnishes the nutritive principle by which the hair is nourished and supported. It makes the hair moist, soft and glossy, and is unsurpassed as a hair dressing. It is the most economical preparation ever offered to the public, as its effects remain a long time, making only an occasional application necessary. It is recommended and used by eminent medical men, and officially endorsed by the State Assayer of Massachusetts. The popularity of Hall's Hair Renower has increased with the test of many years, both in this country and in foreign lands, and it is now known and used in all the civilized countries of the world.

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SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

FRESH attractions are constantly added to Woodward's Gardens, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

J. G. COLMERNEL is requested to report to this office from Humboldt Co.

Chew Jackson's Best Sweet Navy Tobacco.

GENERAL MERCHANDISE.

WEDNESDAY M., August 11, 1880.

CANDLES.	
Crystal Wax.....	17 @ 17 1/2
Eagle.....	12 @ 12
Patent Sperm.....	25 @ 30
CANNED GOODS.	
Assorted Pie Fruits.....	
2 1/2 lb cans.....	2 25 @ 1
Tallie do.....	3 50 @ 1
Jams and Jellies.....	3 75 @ 1
Pickles, h'l gal.....	3 25 @ 1
Sardines, or box.....	1 50 @ 1 90
H'l Boxes.....	2 50 @ 2 75
Merry, Paul & Co.'s.....	
Preserved Beef.....	
2 lb doz.....	3 75 @ 3 75
do Beef, 4 lb doz.....	5 50 @ 1
Preserved Mutton.....	
2 lb doz.....	3 50 @ 3 50
Beef Tongue.....	5 00 @ 5 25
Preserved Ham.....	
2 lb doz.....	3 00 @ 3 00
Deviled Ham, 1 lb.....	4 00 @ 1
do Ham, 4 lb doz.....	3 00 @ 1
Boneless Pig Feet.....	
3 lbs.....	2 75 @ 1
Spiced Fillets.....	2 75 @ 1
Head Cheese.....	3 75 @ 1
3 lbs.....	3 75 @ 1
COAL-Jobbing.	
Australian, ton.....	5 00 @ 1
Cool Bay.....	5 50 @ 1
Bellingham Bay.....	5 50 @ 1
Seaside.....	5 50 @ 1
Cumberland.....	12 00 @ 13 00
Mt Diablo.....	4 75 @ 5 75
Lehigh.....	5 00 @ 6 50
Liverpool.....	5 00 @ 6 50
West Hartley.....	8 00 @ 1
Scotch.....	8 00 @ 1
Seranton.....	7 50 @ 1
Vancouver Id.....	7 50 @ 1
Wellington.....	7 00 @ 8 00
Charcoal, sack.....	75 @ 1
Coke, hush.....	60 @ 1
COFFEE.	
Sandwich Id, B.....	25 @ 1
Costa Rica.....	15 @ 16
Ghatemala.....	15 @ 16
Java.....	24 @ 25
Manila.....	15 @ 16
Ground, in c.....	25 @ 1
FISH.	
Sac'to Dry Cod.....	4 1/2 @ 4 1/2
In cases.....	5 @ 5 1/2
Eastern Cod.....	7 1/2 @ 7 1/2
Salmon, h'l.....	7 20 @ 7 50
H'l h'l.....	3 50 @ 4 00
1 lb cans.....	1 30 @ 1 30
Prid Cod, h'l.....	— @ 1
H'l h'l.....	— @ 1
Mackerel, No. 1.....	9 50 @ 10 00
H'l h'l.....	1 55 @ 1 75
Ex. Mass.....	2 70 @ 4 00
Prid Herring, h'l.....	3 00 @ 3 50
Boston Smk'd H'g.....	3 00 @ 3 50
LIME, ETC.	
Plaster, Golden.....	3 00 @ 3 25
Gate Mills.....	10 @ 12 50
Land Plaster, tn 10.....	12 50 @ 15 00
Lime, Sta Cruz.....	1 25 @ 1 50
h'l.....	2 00 @ 2 25
Cement, Rosen.....	4 00 @ 4 50
Portland.....	4 00 @ 4 50
PAINTS.	
Ass'ted sizes, keg.....	5 00 @ 1

RETAIL GROCERIES, ETC.

WEDNESDAY M., August 11, 1880.

Batter, California.....	25 @ 45	Rice.....	8 @ 12
Choice, B.....	25 @ 45	Yeast Pwdr, doz.....	1 50 @ 2 00
Cheese.....	18 @ 25	Can'd Oysters doz.....	2 00 @ 3 50
Eastern.....	25 @ 30	Syrup, S F Gold'n.....	75 @ 1 02
Lard, Cal.....	18 @ 25	Dried Apples, B.....	10 @ 14
Eastern.....	20 @ 25	Ger. Frank.....	12 @ 10
Flour, ex. fam, bbls.....	00 @ 20 00	Pigs, Cal.....	9 @ 15
Corn Meal, B.....	2 1/2 @ 3	Peaches.....	11 @ 10
Sugar, wh. crsd.....	12 @ 13 1/2	Olfs, Kerosene.....	50 @ 60
Light Brown.....	8 @ 9 1/2	Wines, Old Port.....	3 50 @ 4 00
Coffee, Green.....	23 @ 35	French Claret.....	1 00 @ 2 50
Tea, Fine Black.....	50 @ 1 00	Cal, doz hot.....	3 00 @ 4 50
Finest Japan.....	55 @ 1 00	Whisky, O K, gal.....	3 50 @ 4 00
Candies, Adm't.....	15 @ 25	French Brandy.....	4 00 @ 6 00
Soap, Cal.....	7 @ 10		

LUMBER.

WEDNESDAY M., August 11, 1880.

CARGO PRICES OF REDWOOD.		RETAIL PRICES.	
Rough, M.....	14	Rough, M.....	18 00
Surface.....	24 00	Pickets, Rough.....	15 00
Beaded.....	24 00	Pointed.....	16 00
do, No. 1.....	18 00	do, No. 1.....	20 50
do, No. 2.....	24 00	do, No. 2.....	20 50
do, No. 3.....	17 00	do, No. 3.....	25 00
do, No. 4.....	17 00	do, No. 4.....	25 00
do, No. 5.....	17 00	do, No. 5.....	25 00
do, No. 6.....	17 00	do, No. 6.....	25 00
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do, No. 96.....	17 00	do, No. 96.....	25 00
do, No. 97.....	17 00	do, No. 97.....	25 00
do, No. 98.....	17 00	do, No. 98.....	25 00
do, No. 99.....	17 00	do, No. 99.....	25 00
do, No. 100.....	17 00	do, No. 100.....	25 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by Sutro & Co.]

SAN FRANCISCO, August 11, 3 P. M.

SILVER.....		SILVER BARS, 890@910.	SILVER BARS, 10@13 cent.
GOLD BARS, 890@910.			
EXCHANGE ON NEW YORK, 12 1/2.			
Commercial, 50; Paris, 5 francs; Mexico, 49 1/2.			
LONDON CONSOLA, 98 1/2.			
BONDS, 4 1/2.			
113.			
OUTSTANDING TO R. K. by the Bank, 30 th, 42 1/2@45.			

Amusements.

BALDWIN'S THEATER.

THOMAS MAGUIRE.....Manager.
CHAS. H. GOODWIN.....Treasurer.
J. P. CHAPMAN.....Assistant Treasurer.

AN ORPHAN OF THE STATE.

Corner Market and Powell Streets. Open every evening and Saturday matinee. Box office open daily.

BUSH STREET THEATER.

CHAS. E. LOCKE.....Lessee and Manager

THE WEATHERCOCK.

Open every evening and Saturday Matinee.

STANDARD THEATER.

CHAS. E. LOCKE.....Manager

WIDOW BEDOTT.

Box office, for sale of reserved seats, now open.



BOESCH'S PATENT

Hydraulic Mining and Locomotive Head Lights, with the Latest Improvements, making them the best and cheapest in the market.

Pacific Lamp and Reflector Factory.
569 Mission St., San Francisco.

Pumping Engine For Sale.

NEW UPRIGHT WILCOX ENGINE.

1-inch Cylinder, 6-inch Stroke. About 8-Horse Power. Will raise 3,000 gallons per hour. Was used to dig the well at Chronicle office. Never used otherwise, and is in perfect order.

PRICE, \$300.

Mr. Wilcox sold similar engines at \$800 each. I have taken this engine as an attorney fee, and will sell it for this price and WARRANT it. Address

MANUEL EYRE,

Law Office, No. 636 Clay St., room 25, S. F.

Some fine sunny offices (next to the PRESS office), to rent (at very reasonable rates), by Dewey & Co., at 202 Sansome street, corner of Pine,

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,
SAN FRANCISCO, AUGUST 2d, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 18, of Seventy-Five Cents (75c) per share was declared, payable on THURSDAY, August 12, 1880, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York. WM. WILLIS, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Consolidated Virginia Mining Company,
Nevada Block, Room 26, S. F., August 7, 1880.

At a meeting of the Board of Directors of the Consolidated Virginia Mining Co., held this day, a Dividend (No. 53) of Fifty (50) Cents per share, was declared, payable on Monday, August 16, 1880. Transfer books closed until the 17th, inst. A. W. HAVENS, Sec'y.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

Notice is hereby given that at a meeting of the Directors held on the Eleventh day of August, 1880, an assessment (No. 49) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 402 Front street, room 8, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Thirtieth day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Eleventh day of October, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

W. O. WILSON, Secretary.
Office—402 Front street, room 8, San Francisco, California.

W. E. CHAMBERLAIN, JR. THOS. A. ROBINSON



Life Scholarships, \$70.
SEND FOR CIRCULAR.

W. T. GARRATT'S

BRASS and BELL FOUNDRY
SAN FRANCISCO.

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom,

SAN FRANCISCO.

SACRAMENTO BOILER WORKS,

214 & 216 BEALE St. (rear of Ætina Foundry),

J. V. HALL,

PRACTICAL BOILER MAKER.

Marine, Stationary and Portable Boilers, Smoke Stacks
Hydraulic Pipe, Oil or Water Tanks, Ore and
Water Buckets, Gasometers, Girders,
Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK,

Repairing promptly attended to at the lowest possible terms.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

PHELPS

MANUFACTURING COMPANY,

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle
Work, Car Frames and Bolts, Machine
Bolts, Set Screws and Tap Bolts,
Lag or Coach Screws.

ALL STYLES OF FANCY HED BOLTS.

HOT AND COLD PRESSED HEXAGONAL AND
SQUARE NUTS, WASHERS, BOLT ENDS,
TURNBUCKLES, ETC., ETC.

13, 15 and 17 Drumm St., near California,

SAN FRANCISCO, CAL.

Golden State & Miners Iron Works,

Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
sheathing Nails, Rudder Braces, Hinges, Ship and Steam-
boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-
plings and Connections of all sizes and patterns, furnished
with dispatch. PRICES MODERATE. J. H. WEED. V. KINGWELL.

California Machine Works,

WM. H. BIRCH, Prop'r.

119 Beale Street,

San Francisco.

General Mechanical Engineer and Machinist.
Steam Engines, Flour, Quartz and Mining Machinery.
Sole manufacturer of Brodie's Patent Rock Crushers and
Steel-Faced Tappits. Agent and Manufacturer of F. A.
Youse's Patent Steam Packing Rings for Steam Pistons.
The best ever invented; can be applied to any Engine
Piston and give entire satisfaction to those using. Steam,
Hydraulic and Sidewalk Elevators. Repairing promptly at-
tended to.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz
Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron
Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

THOMAS THOMPSON.

THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

WIND MILL. One of the best made in this State
for sale cheap on easy terms. Ad-
dress, W. T., care of Dewey & Co., S. F.

GEORGE W. PRESCOTT.

IRVING M. SCOTT.

H. T. SCOTT.

UNION IRON WORKS,

Office, 61 First St. | Cor. First & Mission Sts., S. F. | P. O. Box, 2128.

BUILDERS OF

STEAM, AIR AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry.—All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

Send for Late Circulars.

PRESCOTT, SCOTT & CO.

William Hawkins,

(SUCCESSOR TO HAWKINS & CANTRELL).

MACHINE WORKS,

210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturer of

IMPROVED PORTABLE HOISTING ENGINES,

FOR MINING AND OTHER PURPOSES.

Also of the HAWKINS' PATENT ELEVATOR HOIST, for Hotels, Warehouses
and Public Buildings.

Steam Engines and all Kinds of Mill and Mining Machinery.

Fulton Iron Works.

Hinckley, Spiers & Hayes.

(ESTABLISHED IN 1855.)

Works, Fremont and Howard Sts. | San Francisco, Cal. | Office, No. 213 Fremont St.

MANUFACTURERS OF

Marine Engines and Boilers,

Propeller Engines either High Pressure or Com-
pound Stern or Side Wheel Engines.

Mining Machinery.

Hoisting Engines and Works, Cages, Ore Buckets, Ore
Cars, Pumping Engines and Pumps, Water Buckets,
Pump Columns, Air Compressors, Air Receivers,
Air Pipes.

Mill Machinery.

Batteries for Dry or Wet Crushing, Amalgamating

of all kinds, either for use on Steamboats and made in accordance with the

Act of Congress regulating the same, or for use on land. Water Pipe, Pump

Air Column, Fish Tanks for Salmon Canneries of every description.

Boiler repairs promptly attended to and at very moderate rates.

Pans, Settlers, Furnaces, Retorts, Concentrators, Ore
Feeders, Rock Breakers, Furnaces for Reducing Ores
Water Jackets, Etc.

Sugar Machinery.

Crushing Rolls, Clarifiers, Vacuum Pans, Air Pumps,
Concentrators, Bag Filters, Charcoal Filters, Blow-up
Tanks, Coolers and Receiving Tanks.

Miscellaneous Machinery.

Flour Mill Machinery, Saw Mill Engines and Boilers,
Dredging Machinery, Oil Well Retorts, Powder Mill Ma-
chinery, Water Wheels.

PACIFIC IRON WORKS,

First and Fremont Streets, between Mission and Howard, San Francisco, Cal.,

RANKIN, BRAYTON & CO.,

Manufacturers of

ENGINES, BOILERS, (MARINE AND STATIONARY. PUMPING, HOISTING, AND MINING MACHINERY

INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS,

CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES,

FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES,

RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES,

SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE

LATEST AND MOST IMPROVED CONSTRUCTION.

Agents for the Allen Engine Governor, Bailey Air Compressor, Howell's

Improved White Furnaces, Walker's Compound Steam Pumps, Etc.

Pacific Rolling Mill Co.,

SAN FRANCISCO, CAL.

MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS
WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON.

Orders Solicited and Promptly Executed.

Office, No. 202 Market St., UNION BLOCK.

L. C. MARSHUTZ.

T. G. CANTRELL.

National Iron Works.

Northwest Cor. Main and Howard Sts., San Francisco.

Stationary and Compound Engines, Quartz Crushing and Amalgamating Machines,
Flour, Sugar and Saw Mill Irons.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.

Repairing of Every Description Promptly Attended to



Corner Beale and Howard Sts.,

SAN FRANCISCO, CAL.

W. H. TAYLOR, Pres't.

JOSEPH MOORE, Sup't.

Builders of Steam Machinery

IN ALL ITS BRANCHES,

Steamboat, Steamship, Land

Engines and Boilers,

HIGH PRESSURE OR COMPOUND.

STEAM VESSELS, of all kinds, built complete with
Hulls of Wood, Iron or Composite.

ORDINARY ENGINES compounded when ad-
visable.

STEAM LAUNCHES, Barges and Steam Tugs con-
structed with reference to the trade in which they are
to be employed. Speed, tonnage and draft of water
guaranteed.

STEAM BOILERS. Particular attention given to
the quality of the material and workmanship, and none
but first-class work produced.

SUGAR MILLS AND SUGAR-MAKING
MACHINERY made after the most approved plans.
Also, all Boiler Iron Work connected therewith.

WATER PIPE, of Boiler or Sheet Iron, of any size
made in suitable lengths for connecting together,
sheets rolled, punched, and packed for shipment ready
to be riveted on the ground.

HYDRAULIC RIVETING. Boiler Work and
Water Pipe made by this establishment, riveted by
Hydraulic Riveting Machinery, that quality of work
being far superior to hand work.

SHIP WORK. Ship and Steam Captains, Steam
Winches, Air and Circulating Pumps, made after the
most approved plans.

PUMPS. Direct Acting Pumps, for Irrigation or City
Water Works purposes, built with the celebrated Davy
Valve Motion, superior to any other Pump.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER,



Several first premiums received
for Quartz Mill Screens, and Per-
forated Sheet Metals of every
description. I would call special
attention to my SLOTT CUT and
SLOTT PUNCHED SCREENS,
which are attracting much at-
tention and giving universal
satisfaction. This is the only
establishment on the coast de-
voted exclusively to the manufac-
ture of Screens. Mill owners using Battery Screens exten-
sively can contract for large supplies at favorable rates.
Orders solicited and promptly attended to.

32 Fremont Street, San Francisco.

E. P. WHITE,

SUCCESSOR TO

La Grande Laundry,

PRINCIPAL OFFICE:

648 Market Street.

LAUNDRY:

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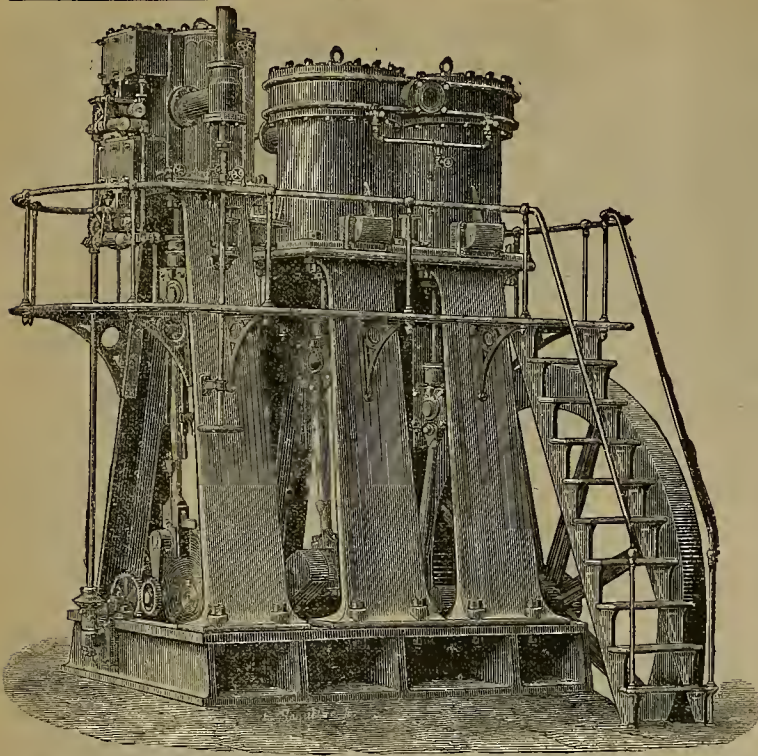
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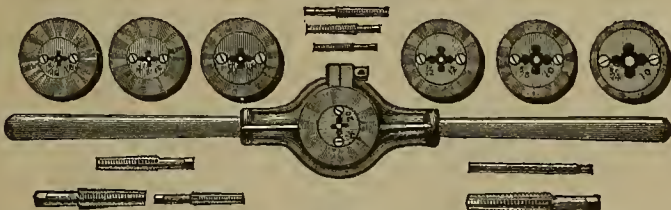
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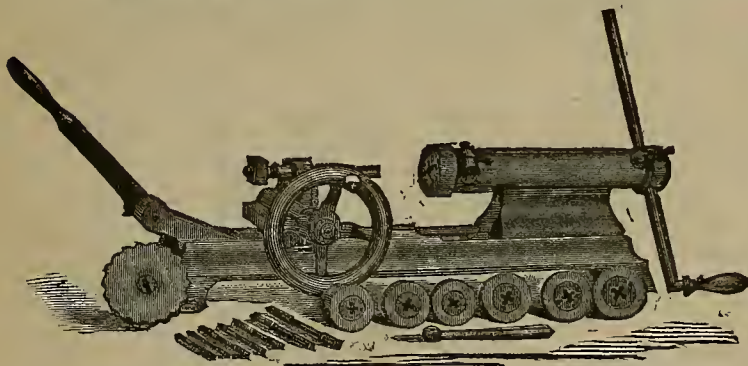
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, AUGUST 21, 1880.

VOLUME XLII
Number 8.

The Mears Chlorination Process.

This new process, the invention of Doctor Mears, is receiving large and deserved attention from practical mining men; for it presents more grounds for confidence than is usual with new processes, even after good results on a small scale have been obtained. As the invention has received some personal examination from the *Engineering and Mining Journal*, we give a summary of its account for the benefit of those who have applied to us for information respecting the process, as well as for the general reader. It is conceded that Dr. Mears has devised a thorough and rapid method of extracting metals, gold especially, from their ores by chlorine gas under pressure. The expense is moderate, and it can be applied to many good mines with advantage to the production in saving more of the fine gold than is possible by amalgamation, and probably in reducing the cost of treatment by the Plattner process.

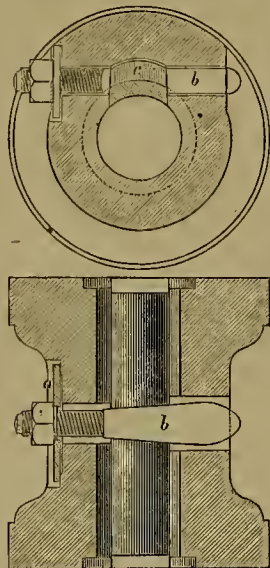
The editor of the *Journal* thinks Dr. Mears is justified in claiming that he can treat charges of ore in less than one-fifth of the time required by the old process. The cost of treatment by the Mears process is given at from \$2 down to 50 cents per ton, according to the local conditions; and it is believed that in most cases the cost will be below the higher figures. The process is now under development in a sensible way at mines. Its owners are men of character and business experience and capital enough to push the process in a proper manner where it will be of use in legitimate mining. These gentlemen place at the disposal of responsible parties interested in testing their ore on a small or a large scale, an apparatus in Philadelphia, in which 100 pounds may be treated at a charge, or a mill in North Carolina, where 10 or 100 tons can be treated, "so that there need be no taking it on faith, works being so accessible." Already the process has been purchased for a number of properties both East and West.

The process is briefly described as follows: "It is an improvement on the old Plattner process of treating ores by chlorine gas, and consists in hastening the combination of chlorine and metal by applying a concentrated solution of chlorine under pressure. Charges of a ton each are treated in revolving, air-tight, lead-lined iron cylinders, from one to two hundred gallons of water being present with each charge. Fine gold is dissolved almost instantly. If properly roasted and pulverized, successful work is done in as short a time as thirty minutes; all calculations are at present, however, based on from one to two hours for each charge. When chlorination is complete, the fluid mud is poured into a filter, thence the chloride of gold in solution runs to a precipitating tank, where it is thrown down by sulphate of iron. Since chloride of silver is not soluble in water, it must be subsequently leached out by one of the well-known methods."

COMSTOCK AIR GALLERIES.—The main north drift starting from the Ophir incline, at the 2500 level, has now passed through the Ophir and Mexican claims and has just reached the Union Consolidated ground, which it has penetrated a distance of 7 ft. The distance across the Union Consolidated ground is 575 ft. but to connect with the Union shaft the drift will not have so far to go by about 150 ft., therefore it will not be long before there will be a grand air gallery on the 2500 level all the way from the Sierra Nevada to the Ophir, and eventually to the C. and C. shaft, and probably southward into the middle mines. It is these great galleries that cool the lower levels of the mines. All the air that could be blown into them, or in any way forced in by mechanical means, would amount to nothing. But by the plan of running these galleries, and connecting them at proper intervals with the vertical shafts, great volumes of surface air pass down to the lowest levels at one point and, traversing the galleries and other openings, come to the surface at another. The larger the openings the larger the volume of air, and the cost for ventilation is nothing after the openings are made; also, the deeper the workings the stronger is the rush of the current of air. —*Enterprise*.

Remarkable Performances Under Water.

A recent number of the London *Times* contains an account, which we summarize, of some remarkable performances under water of Fleuss, the diver, and the patents of the diving apparatus. He appeared at the Royal Aquarium, in the large tank built for the whale and used by the seals, and remained under water two hours and seven minutes. He claims to be able to stay under water for five hours without an air tube or any other connection with the surface, and this circumstance gives him larger freedom of action than is possessed by other divers. For example, he can lie down and bend his body in any position without fear of being lifted up or floated. He possesses the advantages of being able to move independently instead of being rooted to one spot. The diver presents a curious appearance under water, with goggle eyes in his burnished helmet, a strong water-tight dress, and water boots. Spectators amuse themselves by throwing pence for him to pick up. He sharpens his pencil under water, and



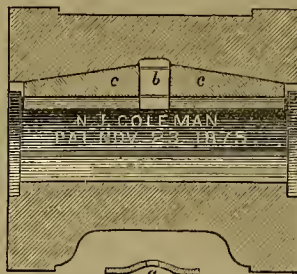
THE COLEMAN TAPPET FOR QUARTZ MILLS.

writes answers to messages sent to him on cardboard. At Ryde he walked for a quarter of a mile under the sea; and at Brighton he went down in five fathoms during rough weather. He could eat under water, Fleuss says he could stay for a longer period than his ordinary limit of five hours. After his performances under water, Fleuss gave a short, crude popular lecture on his apparatus. He supplies the want of fresh air by taking down with him compressed oxygen to supply the waste in breathing; in other words, he has invented a sort of lungs, which reverse the functions of the natural lungs. This recalls Prof. Tyndall's respirator for firemen, which has proved so valuable in practice, by enabling them to breathe what air is left among smoke and noxious vapors. Fleuss' method is more effectual because he carries his supply of oxygen in a compressed form, and is thus enabled to breathe under conditions in which there is no appreciable quantity of air. He states that he has gone through "fire damp" (carburetted hydrogen), and "choke damp" (carbolic acid), and that he could exist in the charged receiver of a gas factory. In the great helmet and in the hollows of his armor there is room for a certain quantity of air, and this is kept fresh and constantly renewed by a stream of oxygen, the pressure of which he regulates at will. This apparatus is said to be very ingenious, and he will employ it in experiments on the submarine use of the telephone.

The firm that has been awarded the contract to construct the debris dam on the Yuba river advertises for 300 laborers and 150 teams.

Outside of the Comstock.

Among that group of mines classed as "outside"—that is, outside of the Comstock—the Monte Cristo is becoming noteworthy. It is yielding paying ore at the slight depth of 150 ft., and the ore is worked at a water-power mill in Six-Mile canyon. The *Virginia Enterprise* says of this interesting property: We hear but little said about this mine, though ore is being regularly extracted from it in a small way. The lead on which it is situated is one of the strongest and best-defined in the country outside of the Comstock. On the same vein are situated the Occidental, Alabama and St. Johns mines. All these have yielded ore that would pay for milling, and a great deal of money has been taken out of the Occidental. It is undoubtedly a true fissure vein. Evidence of this is seen at the Occidental mine, where the walls have been polished by friction. In one place the west or foot-wall projects to the height of many feet above the main body of the ledge, and is as smoothly polished as though it had been ground down by a lapidary. The scratches seen on



The Coleman Tappet.

One of the most troublesome parts of the stamp battery is the tappet. Its frequent slipping, causing delay and stoppage, is a constant source of annoyance, while the bursting of a tappet by too tight driving of the keys is of common occurrence, and forms an item of expense in the running of a quartz mill. The keys also need repairs and renewal.

The Coleman tappet was designed to overcome the above causes of vexation and expense. In this tappet is applied the principle of the compound wedge: *c c* are the gibs and are wedge-shaped; *b* is a forged steel key, terminating in a thread with a nut, while *a* is an elliptical spring which holds the nut in its place and keeps it from jarring loose. It will be readily observed that the drawing up of *b* forces the gibs, *c c*, to spread apart, and in so doing they are brought into perfect contact, and bug the stem with their entire surface; no heavy hammer is necessary; no driving of keys is called for. A small 12-inch monkey-wrench is sufficient; with this tighten the nut, and the tappet is as solid on the stem as if it were part of it.

The following advantages are claimed for the Coleman tappet: 1. It is stronger than any other tappet, as its strength is not cut away in placing the keys outside the gibs. 2. Having a bearing the full length of the gibs, it is superior to the old style, which bears only at or near the key, both on the stem and back of the tappet. 3. It is less apt to be hurst, for it is tightened with a screw, doing away with the jar and uncertainty of a hammer; at the same time a man is better able to judge of the strain or adjustment.

To the objection which might be raised that "it is impossible to hold the tappet in its place with a nut and screw," the agents answer that the use of the improved key gives sufficient purchase to hold the tappet. To a second objection "that the nut will jar loose," they answer that any nut that is tight enough to vibrate with the stem will be sure to stay in place, as if there was no vibration or jar. The most potent reasoning, however, lies in the fact that the tappet holds and the nut stays in place at the mills in which it is being used. These tappets are on exhibition at the Mechanics' fair. The agents are Adams & Carter, room 7, No. 109 California St.

A MINING TOWN BURNED.—The town of Eureka, one of the most important mining camps in Nevada, was the scene of a very destructive fire on the morning of Tuesday, the 17th inst. It was nearly as extensive as the fire which occurred there about a year ago. The fire broke out in a building south of the Odd Fellows' hall, on Main street, and as the wind was blowing violently, the flames spread rapidly and were soon beyond control. The course of this second conflagration was almost the same as that of last year's. All the principal buildings on Main street were destroyed, while everything to the northward was literally swept off by the flames. The fire also spread to the streets occupied for residence, and so sudden and fierce was the attack, that almost nothing was saved by the residents. It is estimated that one-third of the newest and most valuable part of the town has been reduced to ashes. Among the large establishments burned are the office of the *Daily Leader*, Wan's brewery, the International hotel, the Jackson house, etc. The loss is enormous, and is estimated at \$750,000. As a number of families have been rendered homeless, discomfort and perhaps distress are inevitable.

VALUE OF INDUSTRIAL EXHIBITIONS.—Our Centennial exhibition gave American manufacturers plenty of evidence of the value of such displays in extending the market for their productions. The exhibition at Sydney, New South Wales, has proved similarly useful. The display there of some street motors by the Baldwin Locomotive Works, we are informed by the *Springfield Republican*, brought orders for 27, in addition to those displayed at the exhibition.

SAN FRANCISCO'S WEALTH.—The Auditor of the county has submitted the following compiled statement to the State Board of Equalization as required by the law: Value of real estate in San Francisco, \$122,029,868; value of improvements on real estate, \$42,968,640; value of personal property, exclusive of money, \$68,774,195; amount of money, \$19,747,623. Total value of all property, \$253,520,326. Last year's statement is as follows: Real estate and improvements, \$166,429,845; personal property including \$7,388,635 cash, \$51,027,229. Total \$217,487,074. Excess this year, \$36,033,251.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps

Something of Bodie District, Mono Co.—No. 1.

The account must be brief—not intended to be exhaustive. The richest and best developed mine lies along an elevated ridge, embracing an area of two miles in length by from two to three furlongs in width, extending from Bodie bluff on the north to Queen Bee hill on the south, the intermediate ground being known as Silver hill. The formation is understood to be a trachytic diorite, better known perhaps as hard-eye or some other species of porphyry.

The discovery of the district dates back many years, but the period has been short since it began to make any very rapid strides.

From statistics gathered at the express office in Bodie, the amount of bullion shipped to date (August 1st) may be set down in round numbers at \$7,000,000—from the Bodie Con. about \$2,000,000, and something upward of \$4,000,000 from

The Standard Con.,

Which ranks first and foremost among the dividend-paying mines of this State. Its claims cover a wide field on Bodie bluff, and immense ore-bodies are still in sight. Its past and present are too well-known to require more than a passing notice. Its almost unparalleled success has given an impulse to mining developments here, the benefits and magnitudes of which are as yet scarcely felt, but will be more fully realized from year to year as company after company steps to this front with its dividends. There are now running not less than seven mills, aggregating 120 stamps—the Bulwer-Standard of 30 stamps being a model of its kind on the coast, averaging from month to month its 120 tons per day.

The total capacity of all the stamps cannot fall short of 400 tons per day, yet failing to meet the requirements, as there is at least one or two mills in process of erection, and from four to five in contemplation. In addition to this a foundry is in operation, with machine shop connected, prepared to do all kinds of casting and machine work for mills or mines, the capola and crane of full capacity of heat for all present demands. This establishment is not only a great convenience, but in some cases almost an absolute necessity to the mining companies, which, it is hoped, they may never fail to appreciate. Beginning at

Queen Bee Hill

On the south, some mines may be described a little in detail somewhat, though not strictly in order of location on the hill—a few prominent ones receiving no mention mainly from lack of opportunity of interviewing superintendents, to whom you are almost solely indebted for any facts (or fictions if any) that may follow.

The Queen Bee mine is situated on this eastern slope of the hill honored with its name, and has a working shaft to the depth of 400 ft. From this station a crosscut has been run to the ledge, on which a drift has been pushed south 260 ft. and another north 550 ft. This vein is represented as large, carrying some good bunches of ore, and as a prospect that will bear following down. For this purpose machinery has been provided capable of reaching a depth of 1,500 ft.

The University,

On the summit, has been prospected to the depth of 328 ft.; five different veins cut, varying from 2 to 22 ft. in width; assays of the ore going from a nominal sum to as high as \$900; quartz from the 22-ft. vein averaging about \$30 per ton, principally gold. The main shaft, which is now being sunk as fast as the nature of the case will admit, is down about 670 ft., the machinery having a capacity equal to the task of lowering to the depth of 1,500. When the 750 level is reached, a drift will be run for the ledges previously cut.

The Maryland Con.,

In the same vicinity, has also some five ledges, rock running by assay from \$30 to \$150 (silver and gold), some very rich ore specimens being shown from both the 300 and 500 levels. Their engine cabling is of Rohling & Son's best steel, guaranteed to sink 1,500 ft., using cars and cages. Developments go steadily forward. Extracting of ore to commence as soon as the mill in contemplation can be erected.

The Boston Con.

Is working a shaft 300 ft. deep. At the 200-ft. station vein formation between walls is 34 ft. in width. A body of ore, full four ft. in width, on the foot wall, has been developed for 275 ft. in length.

A vein of similar character has also been cut on the 300, and drift pushed on the same 109 ft. An air shaft has been lowered 300 ft., which will soon connect with both levels, when hoisting of ore will begin in earnest. Some remarkable assays reported, one rising \$80,000. The estimate of the ore for milling is put at an average of \$40 per ton.

The Noonday and North Noonday, Located on the southern part of Silver hill, which have already shipped in the neighborhood

of \$300,000, have large ore bodies in sight on the 212, 312 and 412 levels, enough to keep their 40 stamps lively for two years to come.

At this 512 level, their deepest workings, the lode is 20 ft. wide (all ore), working from \$40 to \$50 per ton. Some of the ore, if selected, would run up to very high figures. At this station, near the vein, the company has a pair of Niles' engines, 10x12 cylinder, a large 14-inch pump, and a giraffe for the incline now down from 60 to 70 ft.—the whole run by compressed air, which will much facilitate further sinking and the extracting of ore from these lower levels.

The Booker,

Located in the same vicinity, on the western slope of the ridge, from both the 200 and 300-ft. stations, has developed a good strong vein of rather low-grade ore, which it is thought will be eventually worked.

A crosscut is being at present vigorously pushed for the east or principal vein from this 500-ft. station. It is likely to be reached at any day, as it has already advanced nearly 300 ft.

The Red Cloud,

Which is understood to be chiefly under the management of the Noonday company, is one of the most needed and important enterprises of the district.

Taking advantage of the lesson learned by a little Virginia City experience, the shaft was located considerably east of Silver hill, and is now being enlarged to three compartments. It is designed at present principally as a pumping shaft to drain the Noonday and other mines on the ridge, and possibly as a future working shaft when great depth is attained, as the main veins on this part of the belt at least have a decided eastern dip. The machinery, which is sufficiently powerful for all demands for many years, is all on this ground, and is being put in place with all possible dispatch.

The Oro Mine,

On the summit of Silver hill, is opened by a shaft 475 ft. and three crosscuts. On the 230 level a solid body of ore (18 ft. wide) was cut into on the west side, showing a beautiful black, smooth wall, the crosscut afterwards running through vein matter 160 ft. further to the east or hanging wall. The same vein has since been laid bare on the 340 level, from which some 400 tons have been extracted. Some very rich specimens are to be seen at the mine, the ore bearing a very striking resemblance to some of the rich ores of the Comstock. A streak from 8 to 24 inches in width has recently been found running along the middle of the vein, which has given assays as high as \$4,000, average working values being set down at about \$450 per ton, going from 60% to 80% in silver. Fifteen tons were lately shipped to San Francisco to be worked. It is understood that arrangements have been made with the Dunderberg mill, soon to be completed, to crush the rock.

The Champion's

Main shaft is 600 ft. In cross-cutting on the 400 level three ledges have been cut, averaging five ft. in width. A winze has been sunk 160 ft. on No. 3 ledge passing the entire distance through quartz, which has given assays from \$40 to \$200 per ton. On this 550 level two other veins have been cut, the ore represented to assay about \$100. The water is handled by a fine 12-inch double-acting Cornish pump, from the Risdon Iron Works of your city.

The Addenda.

An incline was originally sunk on the vein 475 ft. The character of the quartz seemed to improve all the way down to the lowest level, where a fine large body of good milling ore was laid bare, similar to that found in the Oro.

For convenience of working a new three-compartment shaft was afterwards started 300 ft. east of the incline, and is now down 520 ft. A station was opened at this 500 level and a crosscut made to the ledge. The entire distance from wall to wall measures at this point 40 ft.; width of payors from seven to eight ft. A drift has been run some 60 ft. on the lowest level, the whole distance through fine milling ore, some of it more than ordinarily rich in black sulphurets and ruby silver. It may be looked upon as quite a nice little bonanza. The average of seven assays was \$278, about 40% gold and 60% silver. Another station has been opened on the 400 level to connect with the ore chamber in the old works.

A notice of some of the mines on Bodie bluff will follow next.

A. C. K.

PROPOSED OCEAN TELEPHONE.—A Cincinnati company, says the *Iron Age*, is negotiating with the cable companies for the lease of a line for eight days for the purpose of testing experiments for telephonic communication with Europe. It is believed that the new French line will be secured. The arrangements, it is thought, will be completed in a few days. The process upon which the proposed work is to be done is based upon the Oranibon invention of 1868 and the recent Klemm patents. The tests will be made from New York city. Only the combination of the two systems mentioned will be tested, to the exclusion of the Bell, the Edison or any of the instruments now in active use, as the new company claim that they are actually infringing.

THE production of the South African diamond mines still continues to be enormous, and the statement is made that the quality of the stones, which is frequently marred by a slight tinge of color, is improving.

Hydraulic Pumps on the Comstock.

Good progress is being made at the Chollar-Norcross-Savage shaft in the work preparatory to putting in the new hydraulic pumps. In these pumps a column of water will be made to take the place of a pump-rod. There will be a large iron pipe leading from the surface to the 2400 level to two pumps stationed at that point. At the bottom of this pipe there will naturally be great pressures, but this will be vastly increased by the down stroke of a huge piston working in a cylinder forming the upper part of the pipe or column. It is estimated that the pressure exerted at the pumps on the 2400 level will be about 5,000 lbs. to the square inch. When a stroke of the piston at the surface has forced a portion of the column of water through the pumps and caused it to make a stroke, this water will rise through a return column, ready to be again forced down by the plunger at the surface. Thus this water will move between the top and bottom of this shaft like an endless belt, the same water being used over and over. The water forced up by the pumps will rise to the 1600 level (a distance of 800 ft.) and will there be discharged into the Suto tunnel.

Could the water of the return pipe also be discharged at the Suto tunnel level it would be a great gain, but owing to the great cost of water for this use (it being necessary to buy all used of the Virginia City and Gold Hill Water Company) this cannot be done.

This lift on the return column from the 1600 level to the surface is compensated for, however, by the pressure given by means of the piston forced down upon the descending column of water by a powerful engine. Had they at the shaft a large stream of fire water, the pressure of the descending column would alone furnish sufficient power to drive the pumps, as the water in this return column could then be discharged into the Suto tunnel, 1,600 ft. below the surface.

The new plan does away with the cumbersome and ponderous balance hoists and pump rods and reduces the liability to troublesome delays by breakages, but the pipes used must be of immense strength to stand the great pressures. Experiments are now in progress in San Francisco for the purpose of ascertaining the thickness of iron or steel that will be required at various points in setting up the apparatus.

The two pumps will send up to the Suto tunnel level 1,600 gallons of water per minute. The present pumps raise 1,000 gallons per minute, therefore in all 2,600 gallons will be sent up by all the pumps. Quits a river! At each stroke of the pumps at the 2400 level a certain quantity of water will be discharged into the Suto tunnel—that is, as much water as is forced in at the bottom of this pipe will come out at the top. It is expected to have this new pumping apparatus in operation by the 1st of January next.—*Enterprise*.

An Odd Accident.

A curious accident happened up at the Park the other day, briefly noticed at the time, but which, upon hearing in full the particulars, assumes the characteristics of a phenomenon out of the usual nature of things. It was this accident which occurred to Mr. Dave Clark, well known in this Territory. He had gone into a bath-room, and had disrobed himself preparatory to the business in hand. In one of the pockets of his coat were about 40 dynamite caps, exploded by electricity. From the head of the cap two wires protrude, and the cap having been fitted on the cartridge, the wires are connected with a battery and the charge fired. Occasionally, as is well known, the air becomes heavily charged with electricity, and this result is sometimes disastrous. On this occasion Mr. Clark, after hanging up his coat, shook out of the folds some other garment, and a terrific explosion occurred. The air was heavily charged with the electrical fluid, clouds were overhanging the Park, etc., and it is supposed that the shaking of the garment acted in some manner in increasing the electricity, or putting it into increased activity. At all events the caps exploded, and Mr. Clark, who, very fortunately, was standing with his back towards the coat, was covered with small wounds which the copper pieces inflicted. The coat was torn to shreds, and the boards against which the coat hung were perforated with the pieces of flying metal. When the power of the caps is taken into consideration, the escape of Mr. Clark may be considered very strange, but not more strange than was this cause curious, a sufficient amount of electricity in the air to explode the caps.—*Salt Lake Tribune*.

STEAM ON THE ERIE CANAL.—Since 1872 steam has been gradually working its way on to the Erie canal. After various experiments as to the style of craft and mode of propulsion, a company has at last been organized, in accordance with the laws of New York State, under the name of the Canal and Lake Steamboat Company. The *Commercial Advertiser* says that the company is financially strong, and should the present venture prove as satisfactory as anticipated, funds for placing a numerous fleet of steamers in operation will be forthcoming. The company has already constructed, or has in process of construction, ten first-class, full-sized steamer canal boats. Seven of them will be built at Ithaca and three at Tonawanda. The engine will be of the style known as the compound condenser.

Gravel Mining in Nevada County.

The editor of the *Transcript*, Nevada City, has visited the various mining camps of the county and published accounts of them in his paper, from which we give the following summary of operations in the vicinity of Moore's Flat and Snow Point. Owing to the severity of last winter mining was begun this season later than usual. At and about Moore's Flat the outlook is very promising.

The Illinois claim, owned by Thos. Dowling and situated at the old town, has been an extensively paying property in the past, and is as yet far from being worked out. No work was done there last year, and when it was resumed this spring a landslide occurred, filling up the tunnel and causing a delay for two months. Some 15 men with monitors are now at work washing good gravel, and a clean-up will be made soon.

The Wa Yen Co. employ about 50 Chinamen. At the old town they are working a promising streak with two monitors. East of the old town they are running a hedrock tunnel into what is known as the Bell ground (the Ohio, Paradise, Paradise Lost, etc.), and expect to reach the channel about Christmas. They are putting a Burslugh drill in place to assist them in hastening this conclusion of this undertaking. The Wa Yen Co. is credited with having cleaned-up over \$50,000 last year.

The Boston, at Woolsey's Flat, has been the property of the Eureka Lake Co. for three years past, and is under the superintendence of R. McMurray. About 90 men are employed, and six monitors are in use. The channel here is extensive and rich, and the claim is reputed to be paying large dividends.

The Bluehanks, adjoining the Boston, is owned by four practical miners. It is thought to be one of the best properties of its size on the ridge. As the washing in the Boston claims also removes a large part of the top dirt in the Bluehanks, the latter company are "resting on their oars" for the present. They have done no work there for two years now, but will resume next season.

Blackwell & Wand's recent development at Snow Point continues to hold its own, notwithstanding this prophecy of certain croakers that it would "peter out" before the news of the strike had gone the round of the newspapers. As many men are employed as can be worked to advantage, and the force is being increased as fast as room can be made. Numerous large nuggets are daily found, and the gravel still averages as high as over. I am assured by the leading mining men at Moore's Flat that this importance of the development has not been in any respect exaggerated.

Pendleton & Co., who are running a tunnel from the opposite side of the ridge to tap the same channel, are meeting with indications which lead them to believe they will open on pay dirt within a short time.

There are this summer a large number of prospectors in gravel busy within a short distance of Moore's Flat, and several of them have first-rate outlooks. This whole portion of the ridge indeed is in a fair way to regain its old-time reputation as a prolific gold-field.

NYE COUNTY (NEV.) MINES.—This mines of Nye county are attracting considerable attention at present, says the *Belmont Courier*, especially those of Grantsville. It would pay capital to come this way to seek investment. In Philadelphia district there are mines, as good as any in this county, shut down for want of capital to work them. Jefferson is almost deserted, and yet there are mines there that would well repay a judicious outlay for their proper development. The Belmont mine is being worked steadily and producing a fair quantity of good ore. Spanish Belt district, which lay under a cloud so long, is now making a showing through the Barcelona company's mines that will cause a stir before this time next year. There are also good mines at Downeyville, Ellsworth, Lodi, Ophir Canyon, Jett Canyon and Northumberland that would well repay the investment of capital. The mines of San Antonio were rich on top, and are almost certain to prove productive again when properly opened up. The mines at Morey never looked better, and they are producing sufficient ore of a good grade to keep the mill running to its full capacity. There is a probability of operations being carried on on a more extensive scale in the Tyro Con. mines. Altogether the outlook for Nye is better than it has been for years.

THE DISSOCIATION OF IODINE.—Prof. Victor Mayer reported to the German Chemical Society of Berlin, at its last meeting, that he had succeeded in determining the vapor-density of iodine at a considerably higher temperature than before, and that he had obtained values closely approximating to those required on the assumption that the gas, under the circumstances of the experiment, consisted of monatomic iodine molecules. If possible, he proposes to extend his observations to still higher temperatures, and for this purpose will employ the lately-described oil-furnace of Deville and Troost, which is capable of fusing porcelain.

The number of submarine cables at present in operation is said to be 555, with a cable length of 69,500 nautical miles.

COTTON goods manufactured in South Carolina are now selling in New England.

MECHANICAL PROGRESS.

Welding Iron and Steel.

German engineers are now discussing eagerly a question which has seriously engaged attention in this country, and though nothing conclusive has been reached abroad, it will be profitable to review briefly the conflicting opinions offered, based upon experience and in some cases upon experiments of a specific character. The last German engineer to take up the subject is Herr C. Petersen, of Eschweiler, from whose paper, read before an association of railroad engineers, we glean the following: The welding of iron is dependent upon its property to assume a pasty state within a certain range of temperature, and it may be stated in a general way that the facility with which the welding may be performed is dependent upon the duration of this peculiar condition.

Leaving out of consideration other circumstances affecting welding, it is conceded by the majority of metallurgists, that an increase in the percentage of carbon in the iron impairs the property of welding, and it is generally believed that when 2% is reached it ceases entirely. It might be concluded that therefore it is desirable to keep the carbon within the lowest limits attainable, but there is some diversity of opinion on this point, because a second important condition for good welding comes into play. It is necessary, in order to unite two pieces of iron, to make the surfaces to be welded free from any coating of oxide, a matter which is generally reached by fluxing the oxide by means of sand, borax, etc.; and some hold that a certain percentage of carbon is necessary in order to afford material for the reduction of this oxide.

Welding, among others, maintains that such is not the case, and the silicate of iron contained in wrought iron plays an important role. These theoretical considerations have quite recently become of considerable interest, because they may offer a clue to detecting the reason why the steel produced by the open-hearth and Bessemer processes is generally inferior as regards welding power to wrought iron, an inferiority which stands in the way of the more general adoption of steel in place of wrought iron. The former, it is true, can be welded, but there are many practical difficulties. Certainly steel-headed rails show a case of good welding, and tires, tubes, etc., have been made of Bessemer steel on a large scale, but still steel cannot compare in this respect with wrought iron. It is said that hot working in the Bessemer converter or open-hearth steel furnace favorably affects the welding power, and this is explained by pointing to the fact that hot steel will contain a smaller amount of oxide mechanically mixed than that produced at lower temperatures.

Herr Petersen claims that silicon is injurious, while Herr Kochler, of Bonn, during the discussion following the reading of the paper, held that it was not alone not injurious, but actually favorable for good welding. Herr Helmuth took a different view, and stated that at Bochum, during a series of experiments in an open-hearth furnace, they tried keeping the silicon low, but reached no results, and were similarly unsuccessful by increasing the percentage of phosphorus. They then turned to the Bessemer process and commenced overblowing, which improved the welding, though not in a sufficient degree. By using oxides of iron, however, they obtained much better results, but they did not follow out the matter, because they found that pieces welded together had a yellow red fracture near the weld, and Herr Gresser, of Grafenberg, added that the same tendency to red-shortness was observed by them when making a weldable material in the open-hearth furnace. In using the Terreneire alloy they found that a good product was obtained by adding about four times as much manganese as silicon. It was, however, abandoned on account of its high price.

Herr Petersen concludes by giving some interesting data in regard to the influence of arsenic upon the welding of iron. A lot of inch rod was rejected on account of difficulty in welding, and it was found that the heated rods had a fatty luster, and that two rods laid one upon another slid off as though the surfaces were polished. This took place, although the balls in the puddling furnaces and the piles welded well. The cause of this anomaly was found to be that the injurious effect of the arsenic came out strongly only after the carbon had been considerably reduced. The following analyses are given as representing the composition of the pig used in making these rods, the first being white, the second gray pig:

Sulphur.....	0.774	1.843
Phosphorus.....	trace	trace
Copper.....	0.030	0.580
Arsenic.....	4.250	5.000
Antimony.....	1.145	1.068

—Iron.

LUBRICATORS.—The *Young Scientist* remarks: The efficiency of lathes, scroll saws, sewing machines, and even watches, often depends upon the judgment and care used in selecting a lubricator, and this choice is frequently ill made. Common kerosene oil is too often injudiciously used in place of a thicker or more bland oil, because the heat produced by friction rapidly vaporizes the oil and leaves the journal dry.

Crude petroleum, for the same reason, is only fitted for very slowly revolving journals, such as water-wheels. For very heavy machinery, or for gearing, tallow and black lead, rubbed up together, is the best lubricant, and also the best for wagon and carriage axles during hot weather. For light running machinery sperm oil is the best; good olive oil that has not become rancid and acid, is perhaps the second best, and for winter use lard oil is excellent, but is rather too drying to be a first-class lubricant. Castor oil is better for axles in the winter, and black lead with it is a help at any time.

RUNNING LOCOMOTIVES BY ELECTRICITY.—That locomotives can be run by electricity has certainly been demonstrated, not only by Edison but by others also. But whether the use of electricity in that direction can be made practical and profitable has yet to be shown. Edison's little engine at Menlo Park draws a small car up heavy grades and around sharp curves at a speed quite remarkable; and now this bold inventor is baving an electric engine of 100-horse power built, to run between Rockway and Perth Amboy, a distance of eight miles. The new track, it is said, is to have decidedly sensational features, in order to give the fullest test as to what can be done in this direction. It will have several exceedingly sharp curves, one of which will be 30 ft. radius. It will also have some exceedingly steep grades, one of which will be 880 ft. to the mile, and another of the remarkable grade of 2,600 ft. to the mile. A track rising at an angle of half a mile in a distance of one mile, would certainly constitute a very remarkable railway. The grade of 1,980 ft. to the mile, by which the summit of Mt. Washington, in New Hampshire, is reached, is ascended at a very slow pace, and then only by means of a cogged track. We should rather be excused from the first ride up Mr. Edison's grade of 2,600 ft. in a mile over a smooth track, with only electricity as the motive power.

IMPROVED CHAIN MANUFACTURE.—The American Chain Company of New York are manufacturing chains on a new and patented manner of construction. The patent of the new company consists in putting one-quarter more material in the ends of the links, where the strain and friction occurs, than on the sides, where the strain is not so great. They use the same amount and weight of material in a chain of a given size, but claim that by their process it is increased in strength 50%, and in durability 100%. Public competitive tests have been made to show the comparative strength between chains of ordinary make and those which are made by this company. An ordinary chain five-eighths of an inch in diameter stood a tensile strain of ten tons, while a patent chain of the same size stood a strain of sixteen and one half tons before breaking. An ordinary inch chain broke under a strain of twenty-seven tons, while a patented chain of the same size stood a strain of forty-two tons before breaking. The new chains have been used in the lighthouse service along the Atlantic coast for the past year as an experiment, and, it is stated officially, that after being in use that length of time, they were fit for another year's service, although the ordinary chains which have been used heretofore have been renewed yearly, the constant motion of the buoys to which they were attached having worn a one-inch chain, in some cases, down to a quarter of an inch at the end of the link.

HOW TO WELD A BROKEN SPRING PLATE.—Get the length and then take the part of broken plate which is easiest to handle and upset it suitable for welding. Make a piece of iron five-eighths of an inch wide, quite thin at one edge, leaving the other about three-eighths of an inch thick, something like a razor blade. Take a welding heat on the part that has been upset and weld the iron across, having the thick end on the point of the plate. Scarf it for welding, upset the other part of plate and scarf it so that when welding the piece of iron comes between the two steels. In the first heat—it cannot be done in one—don't strike too hard at first, and thin down any thick edges of the scarfs. Take a second heat and the result will be, in the hands of an average smith, a good sound weld. If the steel is at all fiery do not attempt to weld it. Should there be a hole near the broken place, showing, on being heated, any sign of a flaw, make a new plate. The piece of iron welded between facilitates the welding, and also makes up for the length lost in jumping.—*London Coach-Builders' Journal.*

IRON PAINT.—A German paper mentions that a Herr Chr. Spangenberg has patented in Germany a paint composed of pulverized iron and linseed-oil varnish. It is intended for painting damp walls, kettles, outer walls, or, in short, any place or vessel exposed to the action of the open air and to the weather. Should the article to be painted be exposed to frequent changes of temperature, linseed-oil varnish and amber varnish should both be mixed with the paint intended for the first two coats, without the addition of any artificial drying medium. The first coat should be applied rather thin, the second a little thicker and the last in a rather fluid state. It is not necessary to free iron from rust, grease, etc., by means of acid before applying the paint, as superficial cleaning is sufficient. The paint is equally adapted as weather-proof coating for iron, wood and stone.

SCIENTIFIC PROGRESS.

Is Matter Simply a Mode of Motion?

Science has already relegated to the domain of "motion" all such possibilities of sensation as light, heat, electricity, etc., which were formerly defined as imponderable matter; and now comes Prof. Crooks with his alleged "fourth state of matter," involving conditions which seem to make it quite clear that only gases, but even the most solid bodies with which we are acquainted, such as wood, stone, metals, etc., must also share the same fate, and be considered merely as different modes of motion. The Professor holds that a solid is simply an aggregation of molecules, "separated from each other by a space which is relatively large—possibly enormous—in comparison with the central nuclei we call molecules. These molecules, themselves built up of atoms, are governed by certain forces" the chief of which are attraction and motion. Distant attraction is gravitation, but molecular attraction is cohesion. Both are independent of absolute temperature, but "the mass must be able to bear a reduction of temperature of nearly 300° before the amplitude of the molecular movements would cease." What would result from the arrest of these movements, and the actual contact of these molecules, is beyond our conception. All we know of matter is based wholly upon our experience of molecular movements.

The atomic theory of matter was first announced by Boskovich more than a century ago, and the idea that particles of matter are endowed with both attraction and repulsion, which is involved in that theory, has been held by scientific men in general until quite recently. When atoms "are said to touch each other they are by no means in actual contact, but separated by an insuperable repulsive force." This interval of separation may be the five-thousandth part of an inch, more or less. Within this interval, according to Boskovich, if two atoms are brought a little nearer together they will attract each other; if still nearer, they will repel; "but no force, however great, can bring them into mathematical contact." The fundamental assumption was that matter does not continuously fill space. Faraday held that in regard to atoms and the intervening space, space alone is continuous. He further asked, why assume the existence of matter independent of force, and substituted the term, "center of force" for atom. Thus matter, in the ordinary acceptance of the term, disappeared entirely, to make room for the emanations of force, which fill the universe, and atoms to points of force-convergence.

Of late the hypothesis of molecules and atoms has been greatly developed, and their size and motions mathematically measured. This need not be disputed when instruments have been devised by which one million lines can be drawn in the width of an inch, and each line distinctly seen by a microscope. In Boskovich's theory there was no contact of atoms. By the theories of to-day they are constantly coming into contact and violent collision. What we call a solid is the first state of matter, and its molecules are in a constant state of activity. When the temperature of a solid is raised, these molecular movements increase in rapidity and extent of motion, until the mass becomes liquid. Then we have the second state of matter. A still further increase of temperature converts the liquid into a gaseous form, in which the molecules fly about still more freely, and we have the third state of matter. The gaseous condition is one pre-eminently of molecular disturbance, attended with constant collisions with each other and with the sides of the containing vessels. Now, if a gas is so rarified by an approximate vacuum that the collisions of the molecules in their flight are few as compared with the misses, the molecules will obey their natural laws and move in rectilinear lines, like a flight of cannon balls directed to a distant object. This is called by Prof. Crooks the fourth state of matter. The logical inference from which is that what we call matter, whether solid, liquid or gaseous, is nothing more than the effect which the movement of the mass of the molecules exerts upon our senses, as in heat or light.

If we take up a drop of water, the movements of its molecules convey to our mind the sensation of moisture. If we pick up a coin at ordinary temperature, the different motion of its molecules produces upon us an effect which we term metallic, and so on. If the temperature of the coin is raised, a corresponding effect is produced by the change of molecular movement. The Professor holds that the molecule, itself "intangible, invisible and hard to be conceived, is the only true matter;" that the space covered by the motion of the molecules, which is the mass that we call matter, whether gaseous, fluid or solid, "has no more right to be called matter than the air traversed by a rifle bullet can be called lead." From this point of view then matter is but a mode of motion.—*Californian for September.*

INFINTESIMAL FIBERS.—The microscope shows a variation in the thickness of human hair from the 1-250th to the 1-600th part of an inch; but, notwithstanding such fineness, it is a massive cable in comparison with some other

fibers. Thus the thread of the silkworm is many times finer, being from the 1-1700th to the 1-2000th of an inch. This, however, is nothing to the slenderness of the spider's thread, which has been found in some instances to be no more than 1-30,000th of an inch in diameter. The fibers yielded by the vegetable kingdom are also of astonishing minuteness. Thus every fiber of flax is found to be composed of a bundle of other fibrils which are about 1-2500th of an inch in diameter. Similar fibers obtained from the pineapple plant have been ascertained to be no more than 1-5000th or even 1-7000th of an inch in diameter.

Astronomical Observations at Great Elevations.

The progress of modern optics is now furnishing observers with telescopes of a power which exceeds the capacities of our lower atmospheres for their constant employment. The obstacles to definition due to this atmosphere have grown to be so nearly a barrier to any rapid progress, that attention has lately been given to the conditions of vision which it is very commonly supposed will be found to be best on mountain summits. There is no exact information on this subject, however, and Prof. S. P. Langley was therefore led to make some observations on Mount Etna during a visit there in 1878, the result of which he records in the July number of the *American Journal of Science and Arts*. His object was to gather some sort of quantitative estimate of the degree of transparency and definition, to take the place of vague statement, and to give a kind of standard for comparison with sights in our own territory. The station chosen was "Casa del Bosco," at an elevation of about 4,200 ft. The observations were directed to the sole end of determining the character of vision, as tested at night on stars and nebulae, and by day upon the sun. After a limited number of comparisons, he infers that at this station about nine-tenths of the light of a zenith star reaches us, and that only one-tenth is absorbed by our atmosphere. The gain on Etna over a lower station, as tried by the tests of a double star observer, was more in clearness of the atmosphere than in that freedom from tremor which accompanies good definition. The latter was indeed upon the whole better than below, but not conspicuously so.

Prof. Langley concludes, as the result of his researches, that the balance of advantages for astronomical observations is most likely to be found in a dry atmosphere, and certainly at a great elevation. Such elevations have undoubtedly the advantage of diminishing the atmospheric absorption of the more refrangible rays, an absorption so important that it probably cuts off from us the larger portion of the ultra violet spectrum. The gain for observations of precision will be, though positive, not in itself probably such as to justify the difficulty and expense of such a site; but for the study of the nebulae and stellar photometry, the gain is very essential indeed, while for almost every problem in solar physics it may be said without reserve that, for rapid progress, such observation have now become not merely desirable, but indispensable. The summit of a lofty mountain, however, is not a desirable station. At an altitude of 10,000 or 11,000 ft. the observer may still enjoy all the conditions of health that fit him for labor, but beyond this unfavorable conditions increase very fast.

Quoting from his own experience of a stay of ten days upon Pike's Peak, at an altitude of between 14,000 and 15,000 ft., Prof. Langley says that at this height the attenuated atmosphere makes a long stay impossible for some, while even for the healthiest the conditions of life begin to be such as to render continuous hard work scarcely possible. At the same time the mountain condenses about itself continuous clouds, so that, except during a brief period in the autumn, the opportunities for observation are far rarer than on the plains. A dry climate and a table land, at an elevation of something like 10,000 ft., sheltered on the side of the prevalent winds by a mountain range, which precipitates their moisture in clouds that rarely advance beyond the observer's horizon, appear to be the more promising conditions in our present knowledge. Upon the whole, though the ideal station, where atmospheric tremor does not exist, and the observer pursues his studies in an ever-transparent sky, is not to be found on any part of the earth's surface yet examined, we find, says Prof. Langley, within our own territory, in the dry and elevated table-lands of Colorado or New Mexico, every condition which experience points out as favorable.—*Scientific American.*

ELECTRO-DEPOSITION OF BISMUTH.—A series of experiments on the electro-deposition of bismuth, with various solutions of this metal, has recently been carried out in the laboratory of Mr. D. G. Fitzgerald. Sesquioxide of bismuth, dissolved in a hot solution of the double tartrate of soda and potash—Rochelle salt—was found to give excellent results at a temperature of about 160° F. The anode should be considerably larger than the cathode or article to be plated, and the electro-motive force should be between one and two volts. A perfectly adherent deposit of silvery luster, but of a darker color than silver and not liable to tarnish, may readily be obtained on iron or steel, copper or brass.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

silver, proves to carry a preponderance of gold. The assays thus far heard from run from \$26 to \$36 per ton—80 per cent gold. It is claimed that the ledge is more than 100 ft wide in places, and that it can be distinctly traced several miles. Of course the excitement is great and increasing.

The wonderful richness of the Mount Pleasant has already stimulated quartz mining in that district, and this added will soon make Grizzly flat the liveliest camp in the country.

NOTES.—Bernard Lande has bought the Chaparral mine for \$15,000. This mine lies north of the South Fork of the American, and near Chilo Butte bridge. The developments so far made indicate a fine ledge with every prospect of permanence. It is currently reported that the Prospect Flat mine is returning nearly \$1,000 per day. The Texas Hill tunnel of the E. D. W. & D. G. M. Co. continues to make rapid progress. The same may be said of the Colorado River drift.

ITCU STRIKE.—Placer Herald, Aug. 14: Dr. Stone and others, of Auburn, have been prospecting a gravel lead near Hog diggings, in El Dorado county, and last week they reached the bedrock at a depth of 52 ft. At 9 ft from the surface the gravel showed a fair prospect, which improved as they went down, and at the bottom, on the bedrock, they got as high as \$3 to the pan. They are very much pleased, and have already commenced ditting up for hydraulic.

INYO.

WACO STAR MINE.—Independent, Aug. 7: After a suspension of work for several months on this mine, Mr. Barker has recently resumed operations, and results are certainly good promise of a really valuable mine. Surface stripplings show good ore all along the 30 or 40 ft uncovered, and from a 25-ft tunnel 40 odd tons of ore have been piled on the dump. Numerous assays indicate an average value of not less than \$80 a ton, chiefly gold. The pay streak is over 3 ft wide, in about 10 ft of ledge material.

THE SHIVER.—Messrs. Harris & Rhine this week shipped quite a number of sacks of the mixed copper, silver and gold ore from the Hirsch ledge, for a working test in San Francisco. The Hirsch is an extension of the Brown Monster, and is presumed to be a large and valuable mine.

LASSEN.

DIAMOND MOUNTAIN MINES.—Locate, Aug. 6: George S. Pierce visited his mine, on Diamond mountain, last night, and reports work progressing on it very satisfactorily. Since the 7th ult., he has run a drift along the ledge on the 150 level 50 ft, and struck a spur that prospects ledge. A force of men is now at work on the ledge, before he commences the ledge. Mr. Pierce's claim is in a very favorable location, and its developments are indeed flattering.

NOTES.—Messrs. B. Hamilton & Co. are running a drift from their tunnel in the ledge, which shows a solid vein of quartz about 30 ft wide, and prospects from \$15 to \$25 per ton. Mr. Brannan is also doing work on his claim on the same ledge.

MARIPOSA.

HITE'S COVE NOTES.—Cor. Gazette, Aug. 7: The Hite mine continues to yield up its golden treasures to its despoiling owners. There has been late a marked improvement in the mine at various points, and the continuous piling of the 40 stamps, both day and night, on very fine ore, gives the camp a tone of business. Everybody here seems to be kept occupied, and an idle man is seldom to be seen.

SOUTH HITE MINE.—The owners of this property, after 2 years of hard labor and the expenditure of considerable capital, have at last realized their long-expected success. Their tunnel is now in a distance of 800 ft, and has cut the vein at a depth of 500 ft, which shows great strength, and is 3 ft in width, and of good quality. They have drifted on the ore at this point for about 70 ft, and have just let a contract for a raise to connect the 500 level with the shaft, which has reached a depth of 240 ft, and shows a continuous vein of good ore.

THE HITE MINE.—This mine, which is located east of the South Hite company's mill site, is producing some very rich ore. Their tunnel is being run on the vein, and is now in 60 ft. Mr. Bailley, the owner, has about 30 tons of ore on his dump, which I am told is worth from \$100 to \$500 per ton.

THE HITE MINE.—The San Jacinto mine, which joins the South Hite on the east, is opened by a tunnel 300 ft in length, and shows a splendid vein in the face. The tunnel, which is still further east, and on the Hite vein, is working quite a force of men, with flattering prospects.

NORTH HITE & YOSEMITE CO.—This property adjoins the Hite mine on the north. It is a New York company recently incorporated. The mines are to be opened by a deep tunnel from the main Merced river, under the superintendence of Mr. Monnessey, who informs me that work will begin during September.

MONO.

HOMER DISTRICT.—Index, Aug. 6: Jack Hallahan has returned from Virginia City with a stamp prospecting mine, which he intends to locate in this district. The mine is in Bodie at present, but will probably be out in a few days. Mr. Hallahan is thoroughly familiar with amalgamating processes, and will successfully treat any ore intrusted to him for work.

LITTLE EMMA.—This mine is developing into a wonderful bonanza. The rock is fabulously rich and perfectly free. Thursday afternoon we saw Judge Owens pound 4 odd tons of ore, and the next morning 4 odd tons of ore was the product. Some of the pieces would weigh as much as a dollar.

NOTE.—Considerable gold is being produced by pounding up rock and washing it out in pans. Walking around among the miners' cabins one can hear the occupants pounding away night and day.

LUCKY MORTON.—We learn that Mr. Isaac Stead has been mining and for some time has been employed to develop it. The Lucky Morton is the north extension of the May Lundy, and is a splendid property.

BRYANT MINE.—A mighty nice thing has been struck in this mine. A shaft 20 ft in depth has been sunk on the ledge, which is about 5 ft wide. Two ft of it is solid ore so rich that it is good for sore eyes. The pure stuff can be seen sticking out of every piece of the rock. Quite a lot of ore has been taken out and lies on the dump. The Bryant mine is an extension of the May Lundy and Lake View mines, the latter separating it from the former.

NEVADA.

ECREKA NO. 2.—Transcript, Aug. 8: This mine is located on Little Deer creek, and is owned by John Senner, Sr. The ledge, though not of what is known as high grade ore, yet pays sufficiently well to justify the erection of a 4-stamp mill. A new overshoot wheel has just been built and the water turned on last Thursday. The ledge is worked through a tunnel, is large and easily accessible, and judging from the appearance of the plates below the battery after 24 hours' run, promises to yield better returns than were anticipated.

NOTES.—The gravel claims at Liberty Hill and Lowell Hill are panning out first-rate. It is thought next season that these camps will be as lively as any in the county. Liberty Hill is already showing to look splendidly. The owners are more than satisfied with the claim.

GRASS VALLEY NOTES.—Union, Aug. 11: The Tunnel on the Prescott hill ledge has been driven in a distance of over 1,300 ft. A strong ledge of handsome rock shows in the drift, which mills regularly to a fair profit. At the point the tunnel has now reached there is a perpendicular drift from the surface to the level of the tunnel of about 150 ft. The plan is to carry this tunnel right into the Osborn hill range.

EMPIRE MINE.—The pumps have lowered the water in the Empire mine, on Ophir hill, to the 600 level. Everything about the Empire works in good shape.

PRESCOTT HILL MINE.—There is now being a lot of rock crushed in the Orleans mill from the croppings of this ledge. The mine is big showing to look splendidly. The gold being very plentiful though fine.

GRAVEL ITEMS.—Transcript, Aug. 13: The Morgan gravel mine at Lowell Hill is employing about 25 men. The company expects to increase the force to about 50 in a couple of weeks. The gravel that is being taken out pays from \$2.50 to 4 an ounce to the car load.

GRAVEL MINE.—At this mine on Liberty Hill, they have lately started to gravel. Prospecting is still going on, and

will continue to run on the main tunnel. A short time back 30 car loads were run out, and gave a yield of \$775.

RICH PLACES GROUND.—North San Juan Times, Aug. 14: Mr. Riley, who lives a short distance from Columbia Hill, has with others located some placer ground adjoining the Bruley claim on the west. In running a cut Mr. Riley has given the ground a thorough prospecting, and has several times taken out from 50 cents to 5 bits to the pan. He showed us one piece of gold, slightly intermixed with quartz, which weighed 75 cents. The gold in his claim is of a very coarse texture, and the indications are that their mine will pay richly. We are informed that there is a ripple of excitement in that locality, and every foot of ground up there open to location will soon be taken up.

NEVADA CITY NOTES.—Herald, Aug. 12: Hetherington & Hartung, of Scott's flat, have just finished cleaning up, and the result is an unusual profitable one. The North Bloomfield M. Co. yesterday made a large shipment of bullion. Mining at Quaker Hill is almost at a standstill. Quite a number of men are lying idle.

PLACER.

DARDANIELS.—Auburn Herald, Aug. 14: The strike recently made in this mine turns out, on further inquiry, to be a rich one. It is indicated last week. In the claim near the bedrock the gravel is perfectly heaped with gold, visible to the naked eye. On a pretty thorough prospect it turned out from about 75 cents to \$3 to the pan. This is nearly or quite equal the Breco & Wheeler drift claim, the yield of which night, with property be termed fabulous.

CONRAD.—This mine, on Duncan hill, is being vigorously worked by Mr. Conrad. The sinking of the main shaft, which is now down to a depth of 130 ft, is being pushed ahead as fast as 8-hour shifts can do it, and will be continued until a depth of 200 ft is reached, when a station will be opened and levels run.

A GOOD STRIKE.—We briefly mentioned last week that one E. J. Hunter had made a rich strike in an old tunnel in Duncan hill. Since then we have seen some of the rock taken out by Mr. Hunter, and we found it even richer than had been represented. It is like specimens we have seen from the famous Duncan and Shurtliff lead, in the same hill, heavily charged with free gold, and is beautiful to look upon.

QUARTZ DEVELOPMENTS.—Mr. E. W. Roberts has purchased a portion of the old Banvard ranch, 1 mile from town, on which are several valuable mines, which he proposes to develop. A force of men is now at work on one of the leads. The "Oro Fino" shaft, which is now down 40 ft. The vein is 3 ft wide, and the ore mills from \$10 to \$18 per ton free gold, while the sulphates, of which there is from 2 to 3%, go up into the hundreds.

ROCK CREEK NOTES.—The Auburn and Rock Creek mines owned by Eastern capitalists, are situated about 3 miles from Auburn, on Rock creek, and embrace 3 ledges—the Auburn, the Rock Creek and the Bryce. On the Auburn a shaft is down to a depth of 225 ft, at which point the vein is between 6 and 7 ft wide. On the Rock Creek the main shaft is now about 150 ft deep, from which point a level has been run to the east a distance of 194 ft, and the vein is over 10 ft in width. Preparations are now being made by the company for the immediate erection of a fine 20-stamp mill and new steam hoisting works, to take the place of those now run by water.

TRINITY.—A new quartz development, near Damascus, known as the Poole mine, is reported as turning out well. A new 5-stamp mill has been completed at the Decker mine, in Dutch ravine, and is now making its first crushing. Timber and other material for a new quartz mill to be erected on some recently developed lead south of Auburn, has recently arrived at the depot.

PLUMAS.

GENESSEE MINE.—National: While in Genessee valley recently we examined this property, owned by Dr. Quinn. The mill is a 10-stamp, runs by water and seemed to be in good condition. Only a few men are employed taking out quartz, but the property is said to be paying well for the labor. The veins are small, but rich, and much of the ore is gold-bearing. The property has yielded a large amount of money.

NEW DITCH.—An extensive mining operation is being inaugurated in the extreme southern part of the county, and almost on the line, and said to be backed by Boston capital. A large ditch and flume will carry water from South Feather river, a short distance below Little Grass Valley, to the Mooreville ridge, and the flume will be 4 by 6 ft.

GRANITE BASIN.—Lassen Advertiser, Aug. 6: We learn from Dr. Spaulding, who has just returned from a trip to Granite Basin in Plumas county, that the mines are both placer and quartz. The placer mines were discovered in 1854, when they were very rich, and have been worked continuously ever since. None of the quartz ledges, which are numerous in the district, are being worked at present, although the veins are rich and well defined, and free gold is found in the croppings.

SHASTA.

100 AND FIFTY HILL NOTES.—Cor. Reading Independent, Aug. 12: The Chicago mine, located about 3 miles from the town of Igo, seems to be in a very prosperous condition. They are down 220 ft from the surface, and 110 ft from the tunnel. They are in a state of excellent ore that will run \$100 to the ton in silver. The ore vein varies from 12 to 20 inches in width. The mine has shut down for the present, owing to the fact that there is over 200 tons of ore on the dump, and no room for more. Work on the mill, about a half mile below the mine, is being rapidly prosecuted under the direction of Prof. Aarou. They are also building a furnace, in which the ore will be roasted after being crushed.

CENTRAL MINE.—This mine, a short distance from the Chicago, also contains some fine ore, of the same character as the one in the Chicago. Work is being prosecuted slowly.

CENTENAL.—This mine, located at the head of Eagle creek, has been running 2 months. A tunnel 90 ft has been run into the mountain, and it is expected that the main ledge will be tapped upon going 15 ft further. The croppings of this mine are in some places 12 ft wide, and the ore will assay \$50 to the ton in silver and \$250 in gold.

BULL CHOOT ITEMS.—Knox & Co., of the Central mine, are running a 5-stamp battery, and crushing 24 tons per day. The ore will go about \$30 per ton. The shaft is down about 100 ft, and they are now tunneling from the bottom of the shaft. The ledge is about 5 ft wide, and all pay.

REN BLUFF MINE.—This property has a 5-stamp mill running, crushing about 2 tons per day. They expect to stop crushing soon for want of water. Their shaft from the end of the tunnel is down 40 ft. The ledge is 5 ft wide.

NOTES.—Thompson Bros. are down on their ledge about 40 ft; the ore will run about \$20 to the ton. They have no mill, but hire their crushing done. Grant has struck it rich on the Mammoth, the largest mine in the district. They have just commenced prospecting. Oupit & Maloney have erected a 5-stamp custom mill, which will start up soon.

TRINITY.

WEAVER BASIN.—Journal, Aug. 14: Most of the claims in Weaver basin are nearing the close of the cleaning-up process, and we are pleased to know that, without exception, the mines have turned out well for the season of 1879-80. Although the winter was cold and the spring backward, a more than average year's work was accomplished in most of the claims, and the miners generally express themselves well satisfied with the result.

TAYLOR FLAT.—Cor. Journal, Aug. 10: The Trinity hydraulic gold mine, on the extensive gravel beds, is proving richer and richer as they are opened up, and when fairly under way will astonish the natives. In fact they are already astonished at the little work done to get into the auriferous deposit, and that having been reached, in a month or two they may calculate upon a new revelation. Mr. Walker expects to have 20 or 30 men on the mine, or more if he can use them advantageously.

TUOLUMNE.

TUOJA DISTRICT.—Independent, Aug. 14: Parties from this district report rich developments. Messrs. Jack and Dave Coles, late of Sacramento, have purchased 2 claims of Adam Haag, the Lake and Sonora, located on Silver hill. These claims will be immediately opened and developed. In the Rhinedollar, 11 miles north of the above claim, very rich rock has been found, as also in the Fuller, about the same distance south. At the latter 2 shifts are working day and night. The ore is extremely rich in silver and gold. The ledge is 30 ft wide on top, and at a depth of 5 ft the increase of width gives assurance of at least a 150-ft vein. Silver hill is about 90 miles due east from Sonora.

NOTES.—It is said that Divoll & Co. have again struck it rich in their famous camp. On Thursday night of last week a sack of rich ore was packed from the mine by 2 men, who had to relieve each other in its carriage. This we learn from an eye witness. John Ferguson & Co., adjoining Clark, Divoll & Co.'s Bonanza claim, on Gold hill, took out \$900 in coarse pieces in short time Tuesday evening. How much since we have not been able to learn.

NEVADA.

WASHOE DISTRICT.

UNION CO.—Gold Hill News, Aug. 18: Not much in the way of crosscutting will be done this week. Winze No. 2 from the 2400 level is sinking as usual. Work south from the shaft and north from the Ophir line on the 2500 level is making excellent progress, and in both places some good-looking quartz is encountered.

SISIRA NEVADA.—The raise from the 2300 level, to connect with the old shaft, progresses as usual. Preparations are making for raising in the ore body encountered on this level in order to ascertain its make and value. The north drift, 2400 level is also running north to afford a base for crosscuts, with which to open up the ore vein in that direction.

CALIFORNIA.—The joint Ophir crosscut east on the 2000 level, from which the winze to the 2300 level is to be sunk, is making about 3 ft per day. The joint raise to meet this winze is also progressing well. The drift north on the 2300 level is also averaging 3 ft per day toward the ore vein south from the Ophir line. The slopes of the 1650 level are yielding as usual of fair-grade ore.

YELLOW JACK.—The east drift, 2328 level, has attained a total length of 235 ft, and the face is in hard rock, carrying seams of quartz and considerable exceedingly hot water. The crosscut east, 2700 level, and 130 ft south of the north line, is in 50 ft, and in vein material.

GRAND.—On the 2400 level the joint Mexican east crosscut is making 5 ft per day through good vein material.

CROWN POINT.—The drift east on the 3000 level is in 230 ft, and about up to the point where it is to be turned south to connect with workings north from the Belcher incline.

CON. VIRGINIA.—Work in the joint Best & Belcher winze, in the crosscut east on the 2300 level and the drift south, 2300 level, to connect with the joint Best & Belcher winze, progresses as usual. The slope on the 1750 level continue their yield of from 160 to 150 tons of ore per day which is of the usual grade.

BULLION.—Running the diamond drill from the 2340 station of the Bullion combination shaft. Fine quartz and low-grade ore only encountered so far.

ALPHA.—The north drift, 2310 level, continues to penetrate quartz and porphyry, and the work of low grade.

EXCHANGER.—The diamond drill run on the 2800 level and in a westerly direction, has encountered some good quartz, but of low grade.

BELCHER.—Running north on the 3000 level, to effect the earliest possible connection with Crown Point on that level, in order to secure necessary ventilation for extending workings south on that level. That connection should be made during the coming week.

AURORA DISTRICT.

PROSPERITY.—Esmeralda Herald, Aug. 14: In the Blasdel tunnel, on this mine, Read & Co. have advanced a distance of 190 ft, working being pushed rapidly to tap the ledge. The great feature in this tunnel is the fine blue clay and porphyry, which has now been penetrated a distance of 50 ft, and the vein is contained in a few hundred ft of the ledge. The dump resembles at this time the dumps on the Comstock.

GRAND TRUNK.—Work still continues on the crosscut. The formation at present is more solid, and every indication is good for striking in a short distance a solid ledge. A drift is being run on ledge No. 1, and the course the ledge takes goes to show that it is merely a part of the mother vein and will be cut in a few hundred ft. The ore being taken from the drift is good milling.

REAL DEL MONTE.—Last Monday a blast was set off in the bottom of the shaft, a piece of flying rock or the concussion cracking the rim of the clock-camera, causing it to lose water. This necessarily stopped operations temporarily in the bottom of the shaft. Sinking will be resumed when the clock is fixed. The diamond drill is still operating on the 500 level.

NOTE.—Two more new iron cars and 2,000 ft of track iron arrived for the Blasdel mines Thursday evening. Yesterday more lumber arrived for the boarding-house.

COLUMBUS DISTRICT.

LUCKY HILL.—True Fisser, Aug. 14: The grading for a road is all finished and the approach to the mine is now very accessible. The cutting of the chamber for the hoisting machinery at the mouth of the winze is also completed and everything is in readiness for the reception of the machinery.

MONTICELLO.—Official Letter: North drift, 24 level, has passed through several strata of fine ore, and has not yet reached the hanging wall. North drift, 3d level, is making rapid progress. Have discontinued sinking shaft for the present. Drift from 1st level, to connect with old workings, doing well. Stopes and drifts in ore are looking and producing well.

SARATOGA.—The Hanke incline is down 160 ft and shows good ore in the bottom. Assays from this ore body show \$685 per ton. A drift was started in a crosscut with the perpendicular shaft. The work of sinking the incline will be resumed as soon as connection is made with the shaft.

POROS.—The mill at Belleville has begun crushing. Sixteen tons are being shipped from the mine daily. Ore is still being extracted from the lower level.

VICTOR.—Eighteen men have been put on this week, and the extraction of ore will be pushed as rapidly as possible. The ore will be shipped to New Boston and milled there.

HOLMES.—The crosscut to the west side of the gulch is still being run as fast as possible. The crosscut is following the ledge, the ore of which is low grade.

GENERAL JACKSON.—The crosscut to the south is still progressing, and is now in a distance of 30 ft. The face of the crosscut is all in porphyry.

WINNERS.—The shaft is now down 132 ft. The bottom of the shaft still shows a heavy body of ore.

EUREKA DISTRICT.

REINSON CO.—London Mining Journal, July 24: During the week the refinery produced four bars to the value of \$55,000. The manager writes that operations both in mines and smelting works have been carried on with the usual regularity. The chambers are all looking well and turning out the usual quantity of good ore. The machinery both in mine and smelting works is all in good order.

RUBY DUNDERBERG.—Latest advices state that satisfactory work continues to be done in the Dunderberg mine, and the drift to the great Home Ticket lode is being steadily advanced. This week's returns show an increase of 25 tons raised, and the quality is reported as very good. It is said that work is to be recommenced at the Bullwhacker mine. The prospects at the El Dorado continue encouraging, and rich ore is exposed.

SOUTH RUBY HILL.—Sentinel, Aug. 14: Our reporter passed this section a few days since and noted a number of very promising mines. Among others may be mentioned the Renown, owned by John Morrison; the Grand Delivery, owned by A. P. Hageman; the Continental (patented), owned by Jack Kermee; the Grand Entry, owned by R. P. McDaniel and others; and the Keen &

Kemp, originally owned by the parties whose names it bears. The Kennew and Grand Delivery are located well up on the ridge, while the others flank the eastern slope.

SILVER PEAK.—This mine also is driving to tap the main mineral zone of the district in the neighborhood of this group. With no bad luck, the tunnel will get in inside of 15 months. It is now making good progress. When it shall have reached its destination, it will go far towards demonstrating the value of the properties above mentioned.

PARADISE DISTRICT.

BULLION.—Reporter, Aug. 14: Our reporter visited this mine lately and found it extensively prospected, but very badly gutted out above the 1st level. This level is run from a point 50 ft below the surface in the main shaft, and the ore has been stowed out clear to the surface of the ledge for a distance of about 100 ft. The ore at present in the slope is of an exceedingly rich character, carrying both native and ruby silver in considerable quantities. The mine has never been sufficiently opened below the 1st level to form the least opinion relative to its value below that point.

NOTE.—The returns from the working of 20 tons of 2d-class ore at the Bullion mill netted \$400. The ore was worked by wet process to \$3 of the battery assay, and the result was gratifying to all parties.

MONT. ROCK.—Permanent arrangements have been agreed upon whereby the ore from this mine will be worked at the Bullion mill. Some 300 tons of ore are awaiting shipment, and we are informed there is an unlimited quantity of ore in sight in the mine.

THE GLOVEY.—This promising prospect improves rapidly as depth is attained. The ledge is now 4 ft wide and carries ore exceeding in richness anything yet discovered in the camp.

PHILADELPHIA DISTRICT.

BREAST.—Official Letter, Aug. 4: I have discontinued the drift south under the Cassell steps for the present, as the water makes the air very poor. The air is also poor in the stopes in north end of mine. Am raising winze from 300 level to connect with north stope, which will give good air in stope. Have to raise the winze 35 ft through low-grade ore.

SPANISH BELT DISTRICT.

BARCELONA.—Official Letter, Aug. 4: Since my last report we have advanced 5 ft in north level, which continues to look well, with walls perfect and ledge well defined, and yields a large quantity of fine ore which assays over \$500, with antimonial and native silver, and rich in gold.

WHITE PINE DISTRICT.

EBERHARDT & AURORA TUNNEL.—News, Aug. 12: U. S. Deputy Surveyor Thomas J. Read came over last week from Eureka and took the measurements of the Eberhardt & Aurora tunnel. The total length of the tunnel was found to be 5,688 ft, and the face about 1,600 ft below the surface. They are nearly through the South Aurora ground, having but 14 ft to run when the tunnel started up Saturday.

WARD DISTRICT.

NOTES.—Reflex, Aug. 7: Col. Elliott, of the Black hills, has bought the Monroe & Linton property at Osceola. He has leased the Spencer mill, and will immediately proceed to crush 100 tons of ore—50 tons from 2 different places in the mine—for the purpose of satisfying himself of its value. The owners are working satisfactorily, of which there is no doubt, he will erect a mill of his own in the vicinity of the mine and work it in a systematic manner.

ARIZONA.

OLONE DISTRICT.—Silver Belt, Aug. 7: Work on the Centennial mine, in Ramboz camp, continues to make satisfactory revelations of the value of the property. The face of the tunnel is in nearly 200 ft. The drift east from the main shaft, on the 60 level, is now 90 ft in length, and shows the well-defined pay-streak to have an average width of nearly a foot for the entire distance, while the vein itself will average nearly 4 ft.

WEST BOWDOEN.—This mine has a 6-ft vein between walls, with a foot of ore assaying \$12,000. These figures seem incredible, but in view of the fact that 2 tons of ore worked at the Mexican mill paid for the mine and expenses to date, goes far to prove it.

MACK MORRIS.—This mine is giving good ore at a depth of 160 ft. There are 6 ft of high grade ore in the winze. They are running 2 cross-cuts, one of them at a depth of 200 ft.

ANDY CAMPBELL.—This mine, which is located at Old hill, has been taking out ore of a very high grade. They have a large quantity of ore on the dump, which we are informed will average \$300 per ton.

NOTE.—We have seen ore from the Orion mine which assays in silver from \$20 to \$120 and \$300 gold.

THE BAY HORSE DISTRICT.—Ariz. Miner, Aug. 6: We learn from Samuel Hill, that this new district is at the junction of the Green valley wash with the East Fork of the Verde river, and that it shows remarkable prospects. AMERICAN.—This claim is an immense deposit of gold quartz, fully 50 ft wide anyway, and horn spoon prospects running from \$25 into the thousands can be obtained at any depth within that width. The wash shows from the wash up the hill about 700 ft, then disappears under a capping of sandstone.

IDAHO.

BAY HORSE DISTRICT.—Yankee Fork Herald, Aug. 7: The company erecting the smelter at Bay Horse creek, about 5 miles from Challis, is pushing ahead as rapidly as possible, and expect to have everything in readiness for starting the works inside of a month. A good wagon road has been built from Challis to the smelter, and roads are being made to the different mines in the vicinity. The group of mines in the midst of which the smelter is located, is famous for the high-grade ores contained therein. The last shipments of the smelter, during the same time, have shown a yield of over 3 seasons past, have netted large profits to the owners.

RAMSHORN BRIT.—On the Ramshorn vein, at the base of the hill, is the Post Boy; next the Utah Boy; then the Ramshorn, and beyond this the Skylark—all showing strong, well-defined ledges, containing 1st-class shipping ores. The Ramshorn has a large amount of ore on the dump, and is being worked. A tramway is being constructed from the mine to the foot of the hill. The mine is looking better than it ever did.

BULL OF THE WOODS.—West of the Ramshorn is the Bull of the Woods, with about \$10,000 worth of ore on the dump and much in sight. One portion of the location is leased, and an excellent quality of ore is being raised.

BEARDSLEY.—The celebrated Beardsley mine, 1 mile from the smelter. It has a fine showing of ore, and is furnishing on contract 15 tons per day to the smelting company.

A GROUP OF MINES.—West of the Beardsley is the Hood, with a large amount of ore out. The Log Cabin, lower down the mountain, has considerable ore on the dump. All the ore on the hill is carbonate of lead, carrying some of the best lead in the district. The Hood shows from some of the assays from 100 to 500 ounces silver. Parallel with the Keno is the Ood Enough, with about 10 tons of 1st-class ore on the dump. There are also 2 extensions of the Ood Enough, both well defined and containing a good quality of ore.

COLORADO.

BOULDER COUNTY.—News and Courier, Aug. 6: A mill run from the Poor Man, in Old Cliff district, went \$399.07 for first-class and \$115.14 for second. This, as well as the Grand Central, is owned by J. J. Richards. The mill returns for first-class, first-class \$2,227.40 and second \$631.35. The former is 50 ft deep, the latter 30.

ANALOGUE TRICK.—Cor. Herald, Aug. 6: I saw some of the richest ore at this mine I have ever seen in Boulder county. It was decomposed tellurium and rusty gold. It is just coming in the vein or pay-streak, is 12 inches wide on the foot-wall, and another pay-streak 4 inches wide in the gangue rock. It is very rich, and runs \$500 per ton.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending July 27 Aug.	Week Ending Aug. 3 Aug.	Week Ending Aug. 10 Aug.	Week Ending Aug. 17 Aug.
Alpha.....	47 41	5 4	51 48	8 56
Alta.....	1,401.80	1.10	2 1	3 21
Andes.....	50 85c	85c	1.35	75c 21 1.20
Alps.....	45c	40c	50c	30c 60c 45c
Argenta.....	12c	12c	12c	12c
Atlantic.....	25c	25c	25c	25c
Aurora Tunnel.....	2.20	1.05	1.60	3.40 2.05 41 31
Baltimore Con.....	2.20	1.05	1.60	3.40 2.05 41 31
Belcher.....	25c	25c	25c	25c
Best & Belcher.....	82 8	91 7	91 8	141 10
Bullion.....	11 11	1.60	1.65	1 3 12
Bechtel.....	11 11	1.05	1 1	1 1
Belle Isle.....	75c	60c	70c	60c 75c 70c
Bodie.....	5 4	3 3	4.40	4.35 61 44
Benton.....	80c	70c	85c	80c 1.85 11
Bulwer.....	21	2.40	21	2.20 2 2
Boyle.....	10c	80c	15c	30c 20c 25c
Black Hawk.....	2.65	2.60	40 21	2 1.60 1.40
Belvidere.....	30c	25c	15c	30c 20c 15c
Booker.....	30c	25c	15c	30c 20c 15c
Calaveras.....	2.65	1.80	1.90	1 2 1.85 2.40 1.95
California.....	1 90c	1 80c	1.15	1 1.55 1.30
Challenger.....	2.15	1.85	2 1.20	1.95 41 2.60
Chollar.....	4 4	25c	25c	25c 30c
Confidence.....	20c	25c	25c	25c 30c
Concordia.....	3 12	2.80	2 3	2.95 3.45 2.80
Crown Point.....	1.55	1.11	1.05	1.60 1.15 3.40 1.10
Crocker.....	55c	30c	15c	30c 35c 25c
Champion.....	70c	70c	70c	70c
Dayton.....	12c	12c	12c	12c
DeFrees.....	40c	40c	40c	40c
Danby.....	13 14	14 14	14 15	15 15 15 15
Eureka Con.....	13 14	14 14	14 15	15 15 15 15
Eschschuer.....	11 11	1.40	1.05	1 1.40 2.65 11
Endowment.....	1.30	1.11	1 1.20	1 1 25c
Gen Thomas.....	1.30	1.11	1 1.20	1 1 25c
Grand Prize.....	1.30	1.11	1 1.20	1 1 25c
Gila.....	1.30	1.11	1 1.20	1 1 25c
Golden Chariot.....	1.30	1.11	1 1.20	1 1 25c
Golden Terra.....	1.30	1.11	1 1.20	1 1 25c
Goodrich.....	1.30	1.11	1 1.20	1 1 25c
Gould & Curry.....	1.30	1.11	1 1.20	1 1 25c
Hale & Norcross.....	1.30	1.11	1 1.20	1 1 25c
Hillside.....	1.30	1.11	1 1.20	1 1 25c
Highbridge.....	1.30	1.11	1 1.20	1 1 25c
Honesty.....	1.30	1.11	1 1.20	1 1 25c
Independence.....	1.30	1.11	1 1.20	1 1 25c
Julia.....	1.30	1.11	1 1.20	1 1 25c
Justice.....	1.30	1.11	1 1.20	1 1 25c
Jackson.....	1.30	1.11	1 1.20	1 1 25c
Joe Seates.....	1.30	1.11	1 1.20	1 1 25c
K K Con.....	1.30	1.11	1 1.20	1 1 25c
Kentucky.....	1.30	1.11	1 1.20	1 1 25c
Kosuth.....	1.30	1.11	1 1.20	1 1 25c
Keystone.....	1.30	1.11	1 1.20	1 1 25c
Lady Bryan.....	1.30	1.11	1 1.20	1 1 25c
Lady Wash.....	1.30	1.11	1 1.20	1 1 25c
Leopard.....	1.30	1.11	1 1.20	1 1 25c
Leviathan.....	1.30	1.11	1 1.20	1 1 25c
Leeds.....	1.30	1.11	1 1.20	1 1 25c
Lee.....	1.30	1.11	1 1.20	1 1 25c
May Belle.....	1.30	1.11	1 1.20	1 1 25c
Modoc.....	1.30	1.11	1 1.20	1 1 25c
Manhattan.....	1.30	1.11	1 1.20	1 1 25c
Martha White.....	1.30	1.11	1 1.20	1 1 25c
McClintock.....	1.30	1.11	1 1.20	1 1 25c
Meadow Valley.....	1.30	1.11	1 1.20	1 1 25c
Mexican.....	1.30	1.11	1 1.20	1 1 25c
Miles.....	1.30	1.11	1 1.20	1 1 25c
Morning Star.....	1.30	1.11	1 1.20	1 1 25c
North Con Virginia.....	1.30	1.11	1 1.20	1 1 25c
New York.....	1.30	1.11	1 1.20	1 1 25c
Northern Belle.....	1.30	1.11	1 1.20	1 1 25c
New Coso.....	1.30	1.11	1 1.20	1 1 25c
Navajo.....	1.30	1.11	1 1.20	1 1 25c
Nevada.....	1.30	1.11	1 1.20	1 1 25c
Oakland.....	1.30	1.11	1 1.20	1 1 25c
Ophir.....	1.30	1.11	1 1.20	1 1 25c
Oriental.....	1.30	1.11	1 1.20	1 1 25c
Overman.....	1.30	1.11	1 1.20	1 1 25c
Panther.....	1.30	1.11	1 1.20	1 1 25c
Phenix.....	1.30	1.11	1 1.20	1 1 25c
Phil Sheridan.....	1.30	1.11	1 1.20	1 1 25c
Potosi.....	1.30	1.11	1 1.20	1 1 25c
Prospect.....	1.30	1.11	1 1.20	1 1 25c
Raymond & Ely.....	1.30	1.11	1 1.20	1 1 25c
Richer.....	1.30	1.11	1 1.20	1 1 25c
Rock Island.....	1.30	1.11	1 1.20	1 1 25c
Rye Patch.....	1.30	1.11	1 1.20	1 1 25c
Rough & Ready.....	1.30	1.11	1 1.20	1 1 25c
Sage.....	1.30	1.11	1 1.20	1 1 25c
Seg Belcher.....	1.30	1.11	1 1.20	1 1 25c
Sierra Nevada.....	1.30	1.11	1 1.20	1 1 25c
Silver Hill.....	1.30	1.11	1 1.20	1 1 25c
Silver King.....	1.30	1.11	1 1.20	1 1 25c
Silver Prize.....	1.30	1.11	1 1.20	1 1 25c
Sucon.....	1.30	1.11	1 1.20	1 1 25c
Summit.....	1.30	1.11	1 1.20	1 1 25c
Scorpion.....	1.30	1.11	1 1.20	1 1 25c
Solid Silver.....	1.30	1.11	1 1.20	1 1 25c
South Bodie.....	1.30	1.11	1 1.20	1 1 25c
South Standard.....	1.30	1.11	1 1.20	1 1 25c
Star.....	1.30	1.11	1 1.20	1 1 25c
St. Louis.....	1.30	1.11	1 1.20	1 1 25c
Syndicate.....	1.30	1.11	1 1.20	1 1 25c
Tioga Con.....	1.30	1.11	1 1.20	1 1 25c
Tiptop.....	1.30	1.11	1 1.20	1 1 25c
Trojan.....	1.30	1.11	1 1.20	1 1 25c
Union Con.....	1.30	1.11	1 1.20	1 1 25c
Utah.....	1.30	1.11	1 1.20	1 1 25c
Vermont Con.....	1.30	1.11	1 1.20	1 1 25c
Ward.....	1.30	1.11	1 1.20	1 1 25c
Wells-Fargo.....	1.30	1.11	1 1.20	1 1 25c
Woodville.....	1.30	1.11	1 1.20	1 1 25c
White Cloud.....	1.30	1.11	1 1.20	1 1 25c
Yellow Jacket.....	1.30	1.11	1 1.20	1 1 25c

Sales at S. F. Stock Exchange.

Thursday A.M. Aug. 19.	\$80 Union.....	301/30	
430 Alpha.....	70/71	540 Yellow Jacket.....	301/30
460 Alta.....	32/25	AFTERNOON SESSION.	
490 Andes.....	2/24	470 Addenda.....	70/75c
520 B & Belcher.....	14/14	480 Albion.....	60/65c
550 Belcher.....	3/30	490 Belle Isle.....	70/75c
580 Bodie.....	2/25	500 Bodie.....	70/75c
610 Bullion.....	2/25	510 Bechtel.....	1
640 Benton.....	1/65	520 Belvidere.....	2
670 Calaveras.....	2/40	530 Black Hawk.....	20c
700 California.....	3/30	540 Con Pacific.....	1
730 Challenger.....	3/40	550 Champion.....	25c
760 Chollar.....	4/24	560 Day.....	40/25c
790 Chollar.....	4/24	570 D Standard.....	35c
820 Confidence.....	12/12	580 Dudley.....	44c
850 Crown Point.....	1/40	590 Eureka Con.....	16/16
880 Crocker.....	25c	600 E M Diano.....	40c
910 Croydon.....	25c	610 Gen Thomas.....	25c
940 Eschschuer.....	25c	620 Grand Prize.....	20/19
970 Eschschuer.....	25c	630 Goodrich.....	10/10
1000 Golden Gate.....	1.80/9	640 Hillside.....	10c
1030 Hale & Norcross.....	6/6	650 Independence.....	35c
1060 J K Con.....	80c/85c	660 Jupiter.....	1.20/11
1090 Justice.....	1.60/11	670 McCintock.....	35c
1120 Lady Wash.....	1.50/11	680 M Potosi.....	45c
1150 Mexican Star.....	17/16	690 M Potosi.....	45c
1180 Morning Star.....	32	700 Nevada.....	1.65/11
1210 New York.....	40c	710 Queen Bee.....	15c
1240 Northern Belle.....	1.70/11	720 Sierra Nevada.....	50c
1270 Ophir.....	3.30/35	730 Syndicate.....	10/10
1300 Overman.....	1.70/11	740 Summit.....	10/10
1330 Pacific.....	3.30/35	750 Tiptop.....	1
1360 Quinn.....	50/55c	760 Tiptop.....	1
1390 Savage.....	4.10/42	770 University.....	2.5c
1420 Sierra Nevada.....	18/19	780 Utah.....	3.05
1450 Seg Belcher.....	10		
1480 Silver Hill.....	1.30/14		
1510 St. Louis.....	2.65/27		
1540 Solid Silver.....	25c/20c		
1570 Tiptop.....	20c		
1600 Trojan.....	20c		
1630 Union.....	13/13		
1660 Utah.....	13/13		

ELECTRIC lights are talked of for London streets.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DEBITANT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Addenda G & S M Co	California	4	20	Aug 10	Sept 13	T H Dixon	233 Montgomery st
Andes S M Co	Nevada	12	25	July 8	Sept 16	Butler Burris	309 Montgomery st
Blackhawk G M Co	California	9	20	July 29	Sept 16	H A Charles	419 California st
Belvidere M Co	California	7	25	July 8	Sept 16	C Van Dyck Hubbard	310 Pine st
Belcher S M Co	Nevada	23	50	June 28	Aug 2	Joe Crockett	327 Pine st
Bechtel Con M Co	California	6	25	Aug 11	Sept 16	W H Leut	309 Montgomery st
Booker Con M Co	California	15	15	Aug 10	Sept 16	W H Leut	309 Montgomery st
Champion M Co	California	7	25	July 31	Sept 7	Joe Crockett	327 Pine st
Best & Belcher	Nevada	18	50	July 2	Aug 5	W Willis	309 Montgomery st
Chollar M Co	Nevada	4	50	July 19	Aug 23	W E Dean	309 Montgomery st
Con Imperial M Co	Nevada	12	10	July 21	Aug 19	W E Dean	309 Montgomery st
Con Pacific M Co	California	2	50	July 31	Sept 6	F E Lutz	330 Pine st
Crown Point G & S M Co	Nevada	42	50	July 14	Aug 20	James Newlands	S F Stock Ex
De Fries M & M Co	Nevada	11	20	July 21	Aug 24	Jno T McGeoghegan	318 Pine st
Dudley M Co	California	8	15	July 10	Aug 12	E C Macken	309 Montgomery st
Eureka F & M Co	Utah	23	10	Aug 3	Sept 6	Chas J Collins	227 Montgomery st
Gen Thomas M & M Co	Nevada	6	50	July 20	Aug 24	Wm Willis	309 Montgomery st
Gould & Curry S M Co	Nevada	38	50	Aug 5	Sept 9	A K Dunbar	309 Montgomery st
Hale & Norcross S M Co	Nevada	65	50	Aug 2	Sept 6	J F Lightner	309 Montgomery st
Leviathan M Co	California	4	25	July 13	Aug 12	S D Frisue	309 Montgomery st
Mackay G & S M Co	Nevada	4	15	Aug 6	Sept 9	J M Burington	309 California st
Mammoth M Co	California	5	50	June 16	July 27	A W Rose, Jr.	302 Montgomery st
Maryland Con G & S M Co	California	2	25	Aug 10	Sept 15	E P Farnsworth	202 Sansome st
Mayhew Con M Co	California	5	10	Aug 7	Sept 14	W J Taylor	310 Pine st
Mexican G & S M Co	Nevada	11	10	July 15	Aug 19	C W Moore, Jr	309 Montgomery st
McCracken Con M Co	Arizona	5	40	June 26	Aug 4	Wm Wenzelburger	216 Sansome st
Monte Cristo Con M Co	California	3	10	May 26	July 5	Butler Burris	309 Montgomery st
Mt Potosi Con M Co	Nevada	4	25	July 15	Aug 21	E A Holmes	318 Pine st
Nevada G & S M Co	California	4	25	July 13	Aug 12	S D Frisue	328 Montgomery st
North Bonanza S M Co	Nevada	6	25	June 30	Aug 4	W W Stetson	309 Montgomery st
Oakland Con M Co	California	4	03	July 14	Aug 5	W T Smith	402 Montgomery st
Oro M Co	California	5	50	July 14	Aug 16	Wm Stuart	320 Sansome st
Red Cloud Con M Co	California	8	25	July 14	Sept 23	Wm J Taylor	310 Pine st
Savage S M Co	Nevada	45	10	July 23	Aug 3	C W Moore, Jr	309 Montgomery st
Scorpion S M Co	—	8	10	July 19	Aug 26	Geo K Spuney	310 Pine st
Segregated Belcher M Co	Nevada	17	100	July 31	Sept 3	Geo D Edwards	414 California st
Silver Hill M Co	Nevada	11	25	July 17	Sept 23	W E Dean	309 Montgomery st
Queen Bee M Co	California	7	10	Aug 9	Sept 14	G W Fisher	324 Pine st
Tuscarora M & M Co	Nevada	6	15	June 26	Aug 2	M E Sperling	309 Montgomery st
Vortex M Co	California	1	05	July 12	Aug 36	G W Fisher	324 Pine st
Yellow Jacket S M Co	Nevada	38	100	July 10	Sept 17	Mercer Otley	327 Pine st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Amador Canal & M Co	California	3	100	Aug 13	Sept 21	R N Van Brunt	318 Pine st
Bismark M Co	Nevada	2	03	Aug 17	Sept 21	E H Holmes	309 Montgomery st
Black Hills M Co	Mexico	1	20	June 26	Sept 10	D B Chisholm	327 Pine st
Excelsior Deep Gravel M Co	California	12	10	Aug 4	Sept 6	Theo Widman	404 Montgomery st
Gopher Con M Co	Dakota	1	100	Aug 11	Sept 16	D B Chisholm	327 Pine st
Holmes M Co	Nevada	1	15	July 30	Aug 30	E A Holmes	318 Pine st
Honesty M Co	California	3	20	Aug 10	Sept 10	E B Holmes	302 Montgomery st

The wonderful richness of the Mount Pleasant has already stimulated quartz mining in that district, and this added will soon make Grizzly flat the liveliest camp in the country.

NOTES.—Bernard Lande has bought the Chaparral mine for \$15,000. This mine lies north of the South Fork of the American, and near Chile Hill bridge. The developments so far made indicate a fine ledge with every prospect of permanence. It is currently reported that the Prospect Flat mine is returning nearly \$1,000 per day. The Texas Hill tunnel of the E. D. W. & D. M. Co. continues to make rapid progress. The same may be said of the Conn Hollow drifts.

NEW BRASS.—*Placer Herald*, Aug. 14: Dr. Stone and others of Auburn, have been prospecting a gravel lead near Hot diggings, in El Dorado county, and last week they reached the bedrock at a depth of 52 ft. At 9 ft from the surface the gravel showed a fair prospect, which improved as they went down, and at the bottom, on the bedrock, they got as high as 23 in the pan. They are very much elated, and have already commenced fitting up for hauling.

INYO.

WACO STAR MINE.—*Independent*, Aug. 7: After a suspension of work for several months on this mine, Mr. Bowman recently resumed operations, and the results so far indicate a fine ledge with every prospect of permanence. Surface stripings show good ore all along the 30 or 40 ft uncovered, and from a 25-ft tunnel 40 odd tons of ore have been piled on the dump. Numerous assays indicate an average value of not less than \$80 a ton, chiefly gold. The pay streak is over 3 ft wide, in about 10 ft of ledge matter.

ONE SHOT.—*Messrs. Harris & Rhine* this week shipped quite a number of sacks of the mixed copper, silver and gold ore from the Hirsch ledge, for a working test in San Francisco. The Hirsch is an extension of the Brown Monster, and is presumed to be a large and valuable mine.

LASSEN.

DIAMOND MOUNTAIN MINES.—*Advocate*, Aug. 6: George S. Pierce visited his mine, on Diamond mountain, last night, and reports work progressing on it very satisfactory. Since the 1st ult., he has run a drift along the ledge on the 150 level 50 ft, and struck a spur that prospects handsomely. He intends continuing the drift 100 ft before he quits the ledge. Mr. Pierce's claim is in a very favorable location, and its developments are indeed tantalizing.

NOTES.—*Messrs. B. Hamilton & Co.* are running a drift from their tunnel in on the ledge, which shows a solid vein of quartz about 30 ft wide, and prospects from \$15 to \$25 per ton. Mr. Brantman is also doing work on his claim on the same ledge.

MARIPOSA.

HIRE'S COVE NOTES.—*Cor. Gazette*, Aug. 7: The Hite mine continues to yield up its golden treasures to its deserving owners. There has been of late a marked improvement in the mine at various points, and the continuing pouring of the 40 stamps, both day and night, on very fine ore, gives the camp a tone of business. Every body here seems to be kept occupied, and an idle man is seldom to be seen.

SOUTH HITE MINE.—The owners of this property, after 2 years of hard labor and the expenditure of considerable capital, have at last realized their long-looked-for expectations. Their tunnel is now in the distance of 800 ft, and the ore is still further east, and of a fine quality. This shows great strength, and is 3 ft in width, and of good quality. They have drifted on the ore at this point for about 70 ft, and have just let a contract for a raise to connect the 500 level with the shaft, which has reached a depth of 240 ft, and shows a continuous vein of good ore.

HOOPER MINE.—This mine, which is located east of the South Hite company's mill site, is producing some very rich ore. Their tunnel is being run on the vein, and is now in 60 ft. Mr. Balloy, the owner, has about 50 tons of ore on his dump, which I am told is worth from \$100 to \$500 per ton.

ITZES.—The San Jacinto mine, which adjoins the South Hite on the east, is opened by a tunnel 300 ft in length, and shows a splendid vein in the face. The Juniaita, which is still further east, and of a fine quality, is working quite a force of men, with flattering prospects.

NORTH HITE & YOKUMITE CO.—This property adjoins the Hite mine on the north. It is a New York company recently incorporated. The mines are to be opened by a deep tunnel from the main Merced river, under the superintendence of Mr. Hennessey, who informs me that work will begin during September.

MONO.

HOMER DISTRICT.—*Index*, Aug. 6: Jack Hallahan has returned from Virginia City with a 1-stamp prospecting mill, which he intends erecting in this district. The mill is in Bodie at present, but will probably be out in a few days. Mr. Hallahan is thoroughly familiar with amalgamating processes, and will successfully treat any ore entrusted to him for working.

LITTLE EXMA.—This mine is developing into a wonderful bonanza. The rock is fabulously rich and perfectly free. Thursday afternoon we saw Judge Owens pound up 4 lbs of it in a hand mortar. An ounce of heavy, coarse gold was the product. Some of the pieces would weigh as much as a dollar.

NOTES.—Considerable gold is being produced by pounding up rock and washing it out in pans. Walking around among the miners' cabins one can hear the occupants pounding away night and day.

LUCKY MORRIS.—We learn that Mr. Isaac Stead has bought this mine, and that a force of men will be employed to develop it. The Lucky Morris is the north extension of the May Lundy, and is a splendid property.

BRAYST MINE.—A mighty nice thing has been struck in this mine. A shaft 20 ft in depth has been sunk on the ledge, which is about 5 ft wide. Two ft of it is solid ore so rich that it is good for sore eyes. The pure stuff can be seen sticking out of every piece of the rock. Quite a lot of the ore has been taken out and lies on the dump. The Bryant mine is an extension of the May Lundy and the View mines, the latter separating it from the former.

NEVADA.

ERENKA NO. 2.—*Transcript*, Aug. 8: This mine is located on Little Deer creek, and is owned by John Senner, Sr. The ledge, though not of what is known as high grade ore, yet pays sufficiently well to justify the erection of a 4-stamp mill. A new overshoot which has just been built and the water turned on last Thursday. The ledge is worked through a tunnel, is large and easily obtained, and judging from the appearance of the plates below the battery after 24 hours' run, promises to yield better returns than were anticipated.

NOTES.—The gravel claims at Liberty Hill and Lowell Hill are panning out first-rate. It is thought next season that these camps will be as lively as any in the county. The Nevada City mine continues to look splendidly. The owners are more than satisfied with the claim.

GRAND LEE MINE.—*Union*, Aug. 13: The Tunnel on the Prescott Hill ledge has been driven in a distance of over 1,300 ft. A strong ledge of handsome rock shows in the drift, which mills regularly to a fair profit. At the point the tunnel has now reached there is a perpendicular depth from the surface to the level of the tunnel of about 250 ft. The plan is to carry this tunnel right into the Osborn mill race.

SEAR MINE. The pumps have lowered the water in the Empire mine, on Ophir hill, to the 600 level. Everything about the Empire works in good shape.

PRESCOTT HILL MINE.—There is now being a lot of rock crushed in the Orleans mill from the croppings of this ledge, that makes a big showing in the blanket washings—the gold being very plentiful though fine.

GRAND LEE MINE.—*Transcript*, Aug. 13: The Morgan gravel mine at Lowell Hill is employing about 25 men. The company expects to increase the force to about 50 in a couple of weeks. The gravel that is being taken out pays from \$2.50 to 3 an ounce to the ore load.

DEWEY MINE.—At this mine on Liberty Hill, they have lately raised to gravel. Prospecting is still going on, and

will continue to run on the main tunnel. A short time back 50 car loads were run out, and gave a yield of \$775.

RICH PLACER GROUNDS.—*North San Juan Times*, Aug. 14: Mr. Riley, who lives a short distance from Columbia Hill, has with others located some placer ground adjoining the Broadwell claim on the west. In running a cut Mr. Riley has given the ground a thorough prospecting, and has several times taken out from 50 cents to 5 bits to the pan. He showed us one piece of gold, slightly intermixed with quartz, which weighed 75 cents. The gold in his claim is of a very coarse texture, and the indications are that their mine will pay richly. We are informed that there is quite a ripple of excitement in that locality, and every foot of ground up there open to location will soon be taken up.

NEVADA CITY NOTES.—*Herald*, Aug. 12: Hetherington & Hartung, of Scott's flat, have just finished cleaning up, and the result is an unusual profitable one. The North Bloomfield M. Co. yesterday made a large shipment of bullion. Mining at Quaker Hill is almost at a standstill. Quite a number of men are lying idle.

PLACER.

DARDANERES.—*Aurifer Herald*, Aug. 14: The strike recently made in this mine turns out, on further inquiry, to be even richer than we indicated last week. In the chamber which had been reached the gravel is perfect, and the gold, visible to the naked eye, is in a pretty thorough prospect it turned out from about 75 cents to \$3 to the pan. This is nearly or quite equal the Breese & Wheeler drift claim, the yield of which might, with propriety be termed fabulous.

CONRAD. This mine, on Duncan hill, is being vigorously worked by the Messrs. Roberts. The sinking of the shaft is down to a depth of 130 ft, and is being pushed ahead as fast as 8-hour shifts can do it, and will be continued until a depth of 200 ft is reached, when a station will be opened and levels run.

A GOOD STRIKE.—We briefly mentioned last week that one F. J. Hunter had made a rich strike in an old tunnel taken out by Mr. Hunter, and we found it even richer than had been represented. It is like specimens we have seen from the famous Duncan and Shurtliff lead. In the same hill, heavily charged with free gold, and is beautiful to look upon.

QUARTZ DEVELOPMENTS.—Mr. E. W. Roberts has purchased a portion of the old Banvard ranch, 1 mile from town, on which are several valuable mines, which he proposes to develop. A force of men is now at work on one of the leads, the "Oro Fino," the shaft of which is now down 40 ft. The vein is 3 ft wide, and the ore mills from \$10 to \$18 per ton free gold, while the sulphurets, of which there is from 2 to 3%, go up into the hundreds.

ROCK CREEK NOTES.—The Auburn and Rock Creek mines owned by Eastern capitalists, are situated about 3 miles from Auburn, on Rock creek, and embrace 3 ledges—the Auburn, the Rock Creek and the Brave. On the Auburn a shaft is down to a depth of 225 ft, at which point the vein is between 6 and 7 ft wide. On the Rock Creek the main shaft is now about 150 ft deep, from which point a level has been run to the east a distance of 194 ft, where the vein is over 10 ft in width. Preparations are now being made by the company for the immediate erection of a fine 20-stamp mill and new steam hoisting works, to take the place of those now run by water.

TRAVIS.—A new quartz development, near Damascus, known as the Poole mine, is reported as turning out well. A new 5-stamp mill has been completed at the Decker mine, in Dutch ravine, and is now making its first crushing. Timber and other material for a new quartz mill to be erected on some recently developed lead south of Auburn, has recently arrived at the depot.

PLUMAS.

GENESSEE MINE.—*National*: While in Genessee valley recently we examined this property, owned by Dr. Quinn. The mill is a 10-stamper, runs by water and seemed to be in good condition. Only a few men are employed taking out quartz, but the property is said to be paying well for the labor. The veins are small, but rich, and much of the slate is gold-bearing. The property has yielded a large amount of money.

NEW DITCH.—An extensive mining operation is being inaugurated in the extreme southern part of the county, and almost on the line, and said to be backed by Boston capital. A large ditch and flume will carry water from South Feather river, a short distance below Little Grass Valley, to the Mooreville ridge, and the flume will be 4 ft by 6 ft. Most of the ditch is in Plumas.

GRANITE BASIN.—*East*, Aug. 6: We learn from Dr. Spaulding, who has just returned from a trip to Granite Basin in Plumas county, that the mines are both placer and quartz. The placer mines were discovered in 1854, when they were very rich, and have been worked continuously ever since. None of the quartz ledges, which are numerous in the district, are being worked at present, although they are large and well defined, and free gold is found in the croppings.

SHASTA.

100 AND PIETY HILL NOTES.—*Cor Reading Independent*, Aug. 12: The Chicago mine, located about 3 miles from the town of Igo, seems to be in a very prosperous condition. They are down 220 ft from the surface, and 110 ft from the tunnel. They are in a shute of excellent ore that will run over \$100 to the ton in silver. The ore vein varies from 12 to 20 inches in width. The mine has shut down for some time, owing to the fact that there is over 200 tons of ore on the dump, and no room for more. Work on the mill, about a half mile below the mine, is being rapidly prosecuted under the direction of Prof. Aaron. They are also building a furnace, in which the ore will be roasted after being crushed.

CRYSTAL MINE.—This mine, a short distance from the Chicago, also contains some fine ore, of the same character as that in the Chicago. Work is being prosecuted slowly.

CENTENAL.—This mine, located at the head of Eagle creek, has been running 2 months. A tunnel 90 ft has been run into the mountain, and it is expected that the main ledge will be tapped upon going 15 ft further. The croppings in this mine are in some places 12 ft wide, and the ore will assay \$50 to the ton in silver and \$2.50 in gold.

BULL CHOP ITEMS.—Knox & Co., of the Central mine, are running a 5-stamp battery, and crushing 25 tons per day. The ore will go about \$30 per ton. The shaft is down about 100 ft, and they are now tunnelling from the bottom of the shaft. The ledge is about 5 ft wide, and all pay rock. They have 8 men employed night and day.

BLUES.—This property has a 5-stamp mill running, crushing about 2 tons per day. They expect to stop crushing soon for want of water. Their shaft from the top of the tunnel is down 40 ft. The ledge is 5 ft wide.

NOTES.—Thompson Bros. are down on their ledge about 40 ft; the ore will run about \$20 to the ton. They have no mill, but hire their crushing done. Grout has struck it, and when fairly under way will astonish the natives. In fact they are already astonished at the little work done to get into the auriferous deposit, and that having been reached, in a month or two you may calculate upon a new revelation. Mr. Walker expects to have 20 or 30 men on the mine, or more if he can use them advantageously.

TOULUMNE.

TOGA DISTRICT.—*Independent*, Aug. 14: Parties from this district report rich developments. Messrs. Jackson and Dave Coles, late of Sacramento, have purchased 2 claims of Adam Haag, the Lake and Sonora, located on Silver hill. These claims will be immediately opened and developed. In the Rhineland, 11 miles north of the above claim, very rich rock has been found, as also in the Fuller, about the same distance south. In the latter, 2 shafts are working day and night. The ore is extremely rich in silver and gold. The ledge is 30 ft wide on top, and at a depth of 5 ft the increase of width gives assurance of at least a 150-ton vein. Silver hill is about 90 miles due east from Sonora.

NOTES.—It is said that Divoll & Co. have again struck it rich in their famous Bonanza claim. On Thursday night of last week a sack of rich ore was packed from the mine by 2 men, who had to relieve each other in its carriage. This we learn from an eye witness. John Ferguson & Co., adjoining Clark, Divoll & Co.'s Bonanza claim, on Old hill, took out 2000 in coarse pieces in short time Tuesday evening. How much since we have not been able to learn.

NEVADA.

WASHOE DISTRICT.

UNION CO.—*Gold Hill News*, Aug. 18: Not much in the way of crosscutting will be done this week. Winze No. 2 from the 240 level is sinking as usual. Work south from the shaft and north from the Ophir line on the 2500 level is making excellent progress, and in both places some good-looking quartz is encountered.

SIEIRA NEVADA.—The mine from the 2300 level, to connect with the old shaft, progresses as usual. Preparations are making for raising in the ore body encountered on this level in order to ascertain its make and value. The north drift, 2400 level, is also running north to afford a base for crosscuts, with which to open up the ore vein in that direction.

CALIFORNIA.—The Joint Ophir crosscut east on the 2000 level, from which the winze to the 2300 level is to be sunk, is making about 3 ft per day. The joint raise to meet this winze is also progressing well. The drift north on the 2300 level is also averaging 3 ft per day toward the one run south from the Ophir line. The slopes of the 1650 level are yielding as usual of fair-grade ore.

YELLOW JACKET.—The east drift, 2325 level, has attained a total length of 235 ft, and the face is in hard rock, carrying seams of quartz and considerable exceedingly hot water. The crosscut east, 2700 level, and 130 ft south of the north line, is in 50 ft, and in vein material.

OMIR.—On the 2500 level the joint Mexican cross cut crosscut is making 5 ft per day through good vein matter.

CROWN POINT.—The drift east on the 3000 level is in 230 ft, and about up to the point where it is to be turned south to connect with workings north from the Belcher incline.

CON. VIRGINIA.—Work in the joint Best & Belcher winze, in the crosscut east on the 2300 level and the drift south, 2300 level, to connect with the joint Best & Belcher winze, progresses as usual. The slopes on the 1750 level continue their yield of from 100 to 150 tons of ore per day which is of the usual grade.

BULLION.—Running the diamond drill from the 2340 station of the Bullion combination shaft. Fine quartz and low-grade ore only encountered so far.

ALPHA.—The north drift, 2810 level, continues to penetrate quartz and porphyry, the former of low grade.

BRONX.—The diamond drill run on the 2500 level and in a westerly direction, has encountered some good quartz, but of low grade.

BEICHER.—Running north on the 3000 level, to effect the earliest possible connection with Crown Point on that level, in order to secure necessary ventilation for extending workings south on that level. That connection should be made during the coming week.

AURORA DISTRICT.

PROSPECTUS.—*Esmeralda Herald*, Aug. 14: In the Bladell tunnel, on this mine, Read & Co. have advanced a distance of 100 ft, work being pushed rapidly to tap the ledge. The great feature in this tunnel is the fine blue clay and porphyry, which has now been penetrated a distance of 80 ft, and will no doubt continue right up to the ceiling of the ledge and dump resembles at this time the dumps on the Comstock.

GRAND TRUNK.—Work still continues on the crosscut. The formation at present is more solid, and every indication is good for striking in a short distance a solid ledge. A drift is being run on ledge No. 1, and the course the ledge takes goes to show that it is merely a part of the mother vein and will connect with it in a few hundred ft. The ore being taken from the drift is good milling.

REAL MOUNT.—Last Monday a blast was set off in the bottom of the shaft, a piece of flying rock or the concussion cracking the rim of the clock-chamber, causing it to lose water. This necessarily stopped operations temporarily in the bottom of the shaft. Sinking will be resumed when the pump is fixed. The diamond drill is still operating on the 500 level.

NOTES.—Two new iron cars and 2,000 ft of track iron arrived for the Bladell mines Thursday evening. Yesterday more lumber arrived for the hoarding-house.

COLUMBUS DISTRICT.

LUCKY HILL.—*True Figure*, Aug. 14: The grading for a road is all finished and the approach to the mine is now very accessible. The cutting of the chamber for the hoisting machinery at the mouth of the winze is also completed and everything is in readiness for the reception of the machinery.

MOUNT DIABLO.—Official Letter: North drift, 2d level, has passed through several stringers of fine ore; have not yet reached the hanging wall. North drift, 2d level, is making rapid progress. Have discontinued sinking shaft for the present. Drift from 1st level, to connect with old workings, doing well. Slopes and drifts in ore are looking and producing well.

SARATOGA.—The Hanke incline is down 100 ft and shows good ore in the bottom. Assays from this ore body show \$55.80 per ton. A drift was started to connect with the perpendicular shaft. The work of sinking the incline will be resumed as soon as connection is made with the shaft.

POTOSI.—The mill at Belleville has begun crushing. Sixteen tons are being shipped from the mine daily. Ore is still being extracted from the lower level.

VICTOR.—Eighteen men have been put on this week, and the extraction of ore will be pushed as rapidly as possible. The ore will be shipped to New Boston and milled there.

HOLMES.—The crosscut to the west side of the gulch is still being run as fast as possible. The crosscut is following the ledge, the ore of which is low grade.

GENERAL JACKSON.—The crosscut to the south is still progressing, and is now in a distance of 30 ft. The face of the crosscut is all in porphyry.

WISDOM.—The shaft is now down 122 ft. The bottom of the shaft still shows a heavy body of ore.

EUREKA DISTRICT.

RICHMOND CO.—*London Mining Journal*, July 24: During the week the relief and ore bars in the value of \$5,000. The manager writes that operations both in mines and smelting works have been carried on with the usual regularity. The chambers are all looking well and turning out the usual quantity of good ore. The machinery both in mine and smelting works is all in good order.

RUBY-DONDERBERG.—Latest advices state that satisfactory work continues to be done in the Dunderberg mine, and the drift to the great Home Ticket lode is being steadily advanced. This week's returns show an increase of 25 tons raised, and the quality is reported as very good. It is said that work is to be recommenced at the Bull-whacker mine. The prospects at the El Dorado continue encouraging, and rich ore is exposed.

SOUTH BAY HILL.—*Sentinel*, Aug. 14: Our reporter passed this section a few days since and noted a number of very promising mines. Among others may be mentioned the Renown, owned by John Morrison; the Grand Delivery, owned by A. P. Hageman; the Continental (patented), owned by Jack Kernean; the Grand Entry, owned by R. P. McDaniel and others; and the Keen &

Keim, originally owned by the parties whose names it bears. The Renown and Grand Delivery are located well up on the ridge, while the others flank the eastern slope.

SILVER PEAK.—This mine also is driving to tap the main mineral zone of the district in the neighborhood of this group. With no bad luck, the tunnel will get in inside of 15 months. It is now making good progress. When it shall have reached its destination, it will go far towards demonstrating the value of the properties above mentioned.

PARADISE DISTRICT.

BULLION.—*Reporter*, Aug. 14: Our reporter visited this mine lately and found it extensively prospected, but very badly gutted out above the 1st level. This level is run from a point 50 ft below the surface in the main shaft, and the ore has been stowed out clear to the surface of the ledge for a distance of about 100 ft. The ore at present in the slope is of an exceedingly rich character, carrying horn, native and ruby silver in considerable quantities. The mine has never been sufficiently opened below the 110 level to form the least opinion relative to its value below that point.

OHIO.—The returns from the working of 20 tons of 2d-class ore at the Bullion mill netted \$400. The ore was worked by wet process to 83% of the battery assay, and the result is very gratifying to all parties.

MEXICO.—Permanent arrangements have been agreed upon whereby the ore from the mine will be worked at the Bullion mill. Some 300 tons of ore are awaiting shipment, and we are informed there is an unlimited quantity of ore in sight in the mine.

THE GLOVE.—This promising prospect improves rapidly as depth is attained. The ledge is now 4 ft wide and carries ore exceeding in richness anything yet discovered in the camp.

PHILADELPHIA DISTRICT.

BELOMT.—Official Letter, Aug. 4: I have discontinued the drift south under the Cassell slope for the present, as the hot weather makes the air very poor. The air is also poor in the slopes in north end of mine. Am raising winze from 300 level to connect with north slopes, which will give good air in slopes. Have to raise the winze 35 ft through low-grade ore.

SPANISH BELT DISTRICT.

BARCELONA.—Official Letter, Aug. 4: Since my last report we have advanced 5 ft in north level, which continues to look well, with walls perfect and ledge well defined, and yields a large quantity of fine ore which assays over \$500, with antimonial and native silver, and rich in gold.

WHITE PINE DISTRICT.

EBERHARDT & AURORA TUNNEL.—*News*, Aug. 12: U. S. Deputy Surveyor Thomas J. Head came over last week from Eureka and took the measurements of the Eberhardt & Aurora tunnel. The total length of the tunnel was found to be 5,683 ft, and the face about 1,600 ft below the surface. They are nearly through the South Aurora ground, having but 14 ft to run when the tunnel started up Saturday.

WARD DISTRICT.

NOTES.—*Reflex*, Aug. 7: Col. Elliott, of the Black hills, has bought the Monroe & Linton property at Osceola. He has leased the Spencer mill, and will immediately proceed to crush 100 tons of ore—50 tons from 2 different places in the mine—for the purpose of satisfying himself of its value. The ore works satisfactorily, of which there is no doubt. He will erect a mill of 100 tons capacity in the vicinity of the mine and work it in a systematic manner.

ARIZONA.

GLOBE DISTRICT.—*Silver Belt*, Aug. 7: Work on the Centennial mine, in Ramboz camp, continues to make satisfactory revelations of the value of the property. The face of the tunnel is in nearly 200 ft. The drift east from the main shaft, on the 00 level, is now 90 ft in length, and shows the well-defined pay-streak to have an average width of nearly a foot for the entire distance, while the vein itself will average nearly 4 ft.

WEST RAMBOZ.—This mine has a 4-ft vein between walls, with a foot of ore assaying \$12,000. These figures seem incredible, but in view of the fact that 2 tons of ore worked at the Mexican mill paid for the mine and expenses to date, goes far to prove it.

MACK MORRIS.—This mine is giving good ore at a depth of 160 ft. There are 6 ft of high grade ore in the winze. They are running 2 cross-cuts, one of them at a depth of 200 ft.

ANDY CAMPBELL.—This mine, which is located at Gold hill, has been taking out ore of a very high grade. They have a large quantity of ore on the dump, which we are informed will average \$300 per ton.

NOTE.—We have seen ore from the Orion mine which assays in silver from \$20 to \$120 and 80% gold.

TOSCA BASIN DISTRICT.—*Arizona Miner*, Aug. 6: We learn from Samuel Hill, that this new district is at the junction of the Green valley with the East Fork of the Verde river, and that it shows remarkable prospects.

AMERICAN.—This claim is an immense deposit of gold quartz, fully 50 ft wide anyway, and horn spout prospects running from \$25 into the thousands can be obtained at any point within that width. It shows from the bed of the wash up the hill about 700 ft, then disappears under a capping of sandstone.

IDAHO.

BAY HORSE DISTRICT.—*Yankee Fork Herald*, Aug. 7: The company erecting the smelter on Bay Horse creek, about 8 miles from Challis, is pushing the work as rapidly as possible and expect to have everything in readiness for starting the works inside of a month. A good wagon road has been built from Challis to the smelter, and roads are being made to the different mines in the vicinity. The group of mines in the midst of which the smelter is located, is famous for the high-grade ores contained therein, the shipments of which, for 3 seasons past, have netted the owners a profit to the owners.

LAMARSHON BELT.—On the Ramshorn vein, at the base of the hill, is the Post Boy; next the Utah Boy; then the Ramshorn, and beyond this the Skylark—all showing strong, well-defined ledges, containing 1st-class shipping ores. The Ramshorn has a large amount of ore on the dump already sacked. A tramway is being constructed from the mine to the foot of the hill. The mine is looking better than it ever did.

BULL OF THE WOODS.—West of the Ramshorn is the Bull of the Woods, with about \$10,000 worth of ore on the dump and much in sight. One portion of the location is leased, and an excellent quality of ore is being raised.

BEARDSLEY.—The celebrated Beardsley mine is 1 mile from the smelter. It has a fine showing of ore, and is furnishing on contract 15 tons per day to the smelting company.

A GROUP OF MINES.—West of the Beardsley is the Hood, with a large amount of ore out. The Log Cabin, lower down the mountain, has considerable ore on the dump. All the ore on the hill is carbonate of lead, carrying some copper. On the summit is the Keno, with over 30 tons of ore out. Assays of the Keno show 500 to 550 ounces silver. Parallel with the Keno is the Good Enough, with about 10 tons of 1st-class ore on the dump. There are also 2 extensions of the Good Enough, both well defined and containing a good quality of ore.

COLORADO.

BOULDER COUNTY.—*News and Courier*, Aug. 6: A mill run from the Poor Man, in Old Cliff district, went \$39.07 for first-class and \$115.14 for second. This, as well as the Grand Central, is owned by J. J. Richio. A mill return from the last went first-class \$2,507.40 and second \$651.39. The former is 50 ft deep, the latter 30.

AMALGAM THER.—*Cor. Herald*, Aug. 6: I saw some of the richest ore at this mine I have ever seen in Boulder county. It was decomposed tellurium and rusty gold. It is just coming in the vein or pay-streak, is 13 inches wide on the foot-wall, and is a very rich, and runs \$500 per ton.

Address of Hon. A. A. Sargent.

The oration by ex-Senator Sargent at the exercises on opening day, is so admirable that we feel we cannot do our young men a better service than to reproduce it in these columns. Senator Sargent—"the trained and skilled mechanic, who rose, step by step, from the printer's case to the Senate of the United States"—is a forcible illustration of the value and dignity of labor. But the example is not necessary; for in these modern times, as the orator well shows, the world's workers occupy the posts of honor. We commend the oration to a careful reading:

Some years ago, while trying certain actions growing out of the breaking of a great reservoir, I was much struck by observing the concurrence of testimony and judgment of scientific men and that of merely practical men upon the nature of forces and their action on bodies—of those whose theories were gained from study and those whose practical experience was the basis of their knowledge. I was led to appreciate that science guides the worker, sometimes unconsciously to himself, and that the theories of philosophers are but the sum of the practical man's experience, or the deductions of genius from his discoveries. Archimedes did not invent the lever. Workmen whose names have not been transmitted used it for ages before he discovered the conditions of its equilibrium and struck out the idea of a center of gravity for all bodies. The invention of machines to move large masses is older than any human record. The architects of the middle ages had practical knowledge of the strength of materials, and had witnessed all variations of falling bodies before Galileo made his experiments on one and discovered the laws relating to the other. A constant succession of illustrious men have prosecuted the study of theoretical mechanics. Their labors have added largely to the world's knowledge of the laws of force, motion, equilibrium, mechanical principles and advantages. But operative mechanics have kept in the advance, and have furnished the necessary problems and illustrations. The natural laws evolved by scientific research have served as guides for experiment and been useful to explain phenomena. If the results have been sometimes merely speculative, sometimes only curious, often abstruse, yet as often they lay the foundation for further achievements in art and mechanics. Such achievements are the product of the workshop, which is the pioneer in the school of progress; for the real advances in mechanics have come from inventors, who have usually been practical and not scientific men. The latter may have observed the processes secured by the former and determined the rules that secured results; but the workmen have invented these processes and given to the world their industrial operation.

Inventors Usually Poor Men.

It is a singular fact that very many of the inventors of the world have been poor men, most of them getting little advantage from education. Thus Arkwright, who invented the cotton-spinning frame, which revolutionized the business of cotton manufacture, and gave great impetus to English prosperity, was born of parents too poor to give him any education. So humble were his fortunes that he earned his living as a barber, shaving in a cellar for a penny until he was 25 years old. He did not acquire even the rudiments of learning until he was 50 years old. Yet he invented a machine that enabled one man to do the work of 130. George Stephenson, the inventor of the high-speed locomotive, was a fireman in various collieries, and could not read until 18 years of age. His son was the constructor of some of the most remarkable engineering structures of modern civilization. The real inventor of the sewing-machine was a farm laborer in early life, and subsequently a cotton-mill operator. The list could be indefinitely extended were it necessary, but is sufficient to illustrate the fact that advancement in mechanic art springs from the workshop as well as from the scientist's study, and may be the product of the humblest worker.

Schools of Object-Teaching.

Hence, grand exhibitions like your's, calling together the inventors and workers of the coast, enabling them to compare their own with others' achievements—to learn by observation what has been attempted and what accomplished, are schools of object-teaching of the most practical character, appealing to sensitive and receptive minds, educated by their own thoughts and experience to appreciate such advantages to their fullest value. The stimulus of such culture upon average minds is marked by the constant improvement in every branch of mechanics, as witnessed by the patents issued by the Government. Any list of patents gives evidence of restless intellectual activity among our mechanics in improvement upon every possible article of use or luxury—from a lead-pencil sharpener to a piano-forte; from a cheese press to a steam fire-engine; from a horse-rake to a quartz crusher. Wherever there is a want, invention struggles to supply it. A thousand busy brains contend with any obstacle until it is surmounted; and it is often the case that simultaneous discovery leaves a doubt as to the originator of a novel invention. Vast grain fields required increased facilities for cultivation, and miracles seemed to be worked by the machine that supplied the want. Demand for rapid communication created the steamer, the railroad, the telephone, the telegraph. War calls for destructive

agencies, which are supplied by repeating arms, by ironclads, by enormous projectiles. Natural laws are infinite, and their application to the uses of life immeasurable. No one can set bounds to that application, for the admitted impossibility of one generation becomes the accomplished fact in another.

Past and Future Development

We pride ourselves upon the advance that we have made over the ways of our fathers. We enumerate with satisfaction the myriad articles of comfort and convenience which we enjoy that they did not have, and display our opulence in the well-filled aisles of our industrial halls, in a collection of articles the names or uses of which would have been utterly strange to them. Some fanciful poet has recalled to earth, hooted upon sight-seeing, and running over with questions, one of the old Puritans who signed the first New England charter on board the *Mayflower*. Under the guidance of a new-made acquaintance, he is given successive views of the telegraph, the railroad train in motion, gas-light, friction matches, and a multitude of other modern inventions, his amazement increasing until he can endure no more, and vanishes with the declaration that the world is turned so upside down no peace is left within it. Yet the progress of the world during the last 260 years has probably not been greater than it will be during the next period of that length. Imagination cannot divine the various forms of machinery and appliances by which man's mastery over earthly things will be extended; and yet experience forbids us to doubt or limit the results. Bulwer, in his "Coming Race," has sought to give some expression to the prophetic instinct that anticipates strange developments in the future from the restless inventive faculty of man. He causes his imagined beings to navigate the air by artificial wings, with scarcely an exertion. They have power of instant and desolating destruction, by means of a lightning-like fluid called *vril*. So potent is it that wars and even discords have ceased; for a child, by its use, could destroy a city or an army, and contest is useless. Nations must repose in each other's good faith, not upon force, where so fatal an instrumentality is within reach of all. But imaginings, even in the mind of a master of fiction, are slow to discover the fields that invention will conquer in the great hereafter.

An Exhibition of 2180.

What a privilege it would be for this audience to attend an exhibition of the San Francisco Mechanics' Institute in 2180. How absorbing our wonder would be as we passed from article to article, of strange names and uses, and missed the objects familiar to our recollection? Inanimate things would seem endowed with intelligence. A weird world would be opened up, astounding the faculties, all unprepared by experience in the progress that had been made to grasp the marvels surrounding them. It would be a fruitless task to endeavor to anticipate that world where all would be so changed and strange. But we may be assured that mankind will have the better for it. Every valuable invention adds to the sum of human happiness and comfort. It gives man stronger grasp on the powers of nature, solves their enigmas, and makes him more at home, and more the master in the world he inhabits. There is no danger of too much refinement or comfort from such sources. Let invention be stimulated to its utmost, its work is repaid in human good; and those instrumentalities which encourage and reward it are worthy of praise and support.

However much a certain class of observers may be led to deprecate the tendency of modern civilization, and forbode its outcome from the occasional agitations that ruffle its surface, it is demonstrable that the comforts once only in reach of the rich are now more generally distributed; that education, once the privilege of the few, is now attainable by the many; that persevering industry is better rewarded, and a certain test of the general welfare—longevity is considerably increased.

The Homes and Modes of Life of the Common People in Olden Times.

The descriptions by old authors of the hovels and modes of life of the commonality in their days cannot now be quoted lest decency be offended. Erasmus described these things with more vigor than delicacy. Holingshead, in producible phrase refers to the rude way of living of his generation. There was scarcely a chimney to the houses, even in considerable towns; the fire was kindled by the well, and the smoke found its way out by the roof, or door, or n-glazed window; the bones were nothing but watling plastered over with clay; the people slept on straw pallets, and had a good round log under the head for a pillow, and almost all furniture and utensils were of wood. I will not describe the rush-covered floors, where dirt was the chief and obtrusive characteristic. In view of such a picture, let him who will declaim against the progress of invention, the arts and refinement. If these are accompanied with some discontent, they certainly remove many of the reasons for it.

Labor-Saving Machinery.

I believe it is not now considered, except by a few among the more ignorant, that labor-saving machinee are injurious to the working classes. It is generally known that such appliances enormously increase employment for the laborer, while enabling him to perform the work of many. Cheapness, caused by facility of production, vastly increases the market for the product, by bringing it within

reach of wider circles of people. Thus human comfort is increased, while the workmen are fully and profitably employed. The construction of the machines also develop new industries. These things are understood by the industrial classes, and few besides demagogues and the densely ignorant dispute them. The world has made a great advance since mobs destroyed Hargreave's spinning jenny, the Jacquard loom and Timoniere's sewing machine. A million persons are now employed in constructing and working machines, and find ample employment in it, where ten thousand persons found such pursuits yielding only a scanty subsistence before invention had added to human wants and resources. It would seem that no one but an enemy of his kind would wish to turn the world back to the rude implements and processes of our ancestors.

Honor to the Inventive Worker.

The tendency of modern civilization is to honor the inventive worker, and to bestow upon him the praise heretofore reserved for the successful warrior. Nations and monarchs have vied with each other in assembling such at their capitals, and in bestowing high award for excellence in mechanic arts. A distinguished English historian complains of this tendency in England, and ascribes to the exhibition given in the summer of 1851 the effect of causing continental nations, and especially Russia, to believe that the ancient spirit of England was failing her, and to presume to cast affront upon her. In the view of this author an extravagant veneration was evoked for mechanical contrivances, and the very words which grateful nations had wrought from out their hearts in praise of tried chiefs and heroes, were plundered, as it were, from the warlike professions, and given to those who, for their own gain, could make the best goods. He complains that it was no longer enough to say that an honest tradesman is a valuable member of society, or that a man who contrives a good machine is ingenious. More was expected of those who had the utterance of public feeling; and it was announced that glory and honor, even true glory and true honor, are due to him who can produce the best articles of trade. For the glory of the mechanic arts, and in token of their conquest over nature, a cathedral of glass was constructed, enclosing them as in a casket, climbing high over stately elms. Kinglake, who so laments, thinks these things indicated to foreigners that England had closed its grand career by a whimsical act of self-adoration, and, therefore, brought on the war of the Crimea, in the anticipation that England, in its excessive devotion to the arts of peace, would not be an obstacle to continental ambition. That her devotion to the arts of peace did not unfit her for war was illustrated in the Crimea, and it was there shown that a people may combine the possession of military strength, and the spirit to use it, with an appreciation of the victories achieved in peace. The Crimea became the scene of one of the most terrible and prolonged conflicts the world has ever seen, and heroic part was borne in it by the nation that but three years before had proclaimed in the "Cathedral of Glass," at Knightsbridge, "Peace on earth, good will to men."

French Exhibitions.

But England has not been the only nation to crown with honor excellence in mechanic arts. In the spring of 1867 France opened its first "exhibition of the productions of agriculture, manufactures and the fine arts." This took place at the very acme of the empire, and was witnessed by distinguished guests from all parts of the earth. A high wave of prosperity swept over France, only broken and thrown back by the corruptions and ambition of the empire, which vainly sought by this exhibition to seat itself more strongly in the hearts of the French people. It is worthy of note that the means devised for this purpose were a tribute to peace and industry—a concession to the grand influence that the industrial classes are gaining among nations. A government more firmly established in the affections of the people would have gained by this grand exposition. As it was, many of the French people saw in it only an effort to show how great and magnificent in peace was the genius of the Napoleonic family. A late exhibition under the Republic was a grand and imposing spectacle, where the self-crowned people gave garlands of honors to those who excelled in industrial arts. It was a tribute of the people to the artisans and artists of the world, and it has not been followed, as in the case of England, by a long and destructive war, nor, as in the case of the empire, by the fall of a dynasty. France was ennobled and invigorated by its tribute to the genius of industry.

America's Tribute to Industry.

I pass by the exhibition at Vienna, in 1879, where a strong, hereditary power followed the heat of the age, that leads to the recognition and reward of eminence in the industrial arts, to refer to our own great Centennial celebration at Philadelphia, where were assembled, in a grand temple erected to industry, not merely our own peerless inventors and workers, but men of all races and climes, each bringing the choicest fabrics known to the artisans of his land, the cunning inventions, rare works of art, characteristic productions, all the material things which are prized for use or beauty. A great republic, existing by the suffrages of busy millions; a nation which had vindicated in its century's history the dignity of labor, and opened,

THE ENGINEER.

Bridge Building in the United States.

[From an address by O. Channuts, Vice-President of the American Society of Civil Engineers.]

While it is true that bridges were built centuries before engineering was recognized as a distinct profession, it is equally true that engineers are admitted to-day the bridge builders of the world. Our predecessors of earlier days worked in wood and stone, and their rules of construction were founded upon the cut-and-try method. We have now added iron and steel as constructive materials, and it becomes a part of our duty to determine, upon scientific principle, the proper distribution of strains, and the due proportioning of materials to resist them, so as to secure the greatest amount of efficiency at the least cost.

As a temporary expedient, wooden bridges were early built in this country, under the familiar names of the Burr truss and the Town lattice, but after the introduction of railroads it became necessary to provide a more efficient system of counter-bracing than could be attained in the earlier forms of trussing. The Howe truss was invented, and was found to be the simplest and best arrangement that could be adopted. This bridge is undoubtedly the best of its kind in the world, and has been of immense service in facilitating the development of our railway system through what may be called its pioneer stage. From data obtained in the railroad reports of the States of Pennsylvania and Ohio, it is estimated that there are now in the United States about 900 miles of bridges upon our railroads, of which, perhaps, one-third are permanent structures of stone and iron, and two-thirds, at least, are temporary structures of wood, which will have to be rebuilt by our engineers.

The demand for more permanent structures has brought about the substitution of iron for wood. As might have been expected, the forms of trussing with which we were most familiar in wood were the first upon which experiments were made in iron. While, however, our English brethren 30 years ago were building plate girders and tubes, our venerable honorary member, Squire Whipple, was studying the subject, and with characteristic modesty laying down the principles of a science of bridge construction, based upon determining the action of the forces, in skeleton structures, by rigid mathematical calculation. His book, printed by his own hand in 1847, contains nearly all that is vitally important connected with the theory of fixed spans, and his bridges stand today as monuments to his skill and reminders to us of the debt we owe to that distinguished engineer.

The concentration of the material into a few parts resulted in the use of the pin connection at the joints, in contradistinction to the rivet, as used in other countries. For compression members, cast iron very readily adapted itself to top chords and posts, and, until late years, was considered satisfactory.

To resist tension it became necessary to forge bars with enlarged heads, now known as eye-bars, and to determine the proper proportion of pin and eye to the section of the bar, so as to develop its full strength. In this we have been reasonably successful, and, with the introduction of improved machinery, we have been enabled to make and secure uniformly reliable bars at a very low cost. To this fact, perhaps, more than to any other, may be attributed the success which has attended the labors of American bridge builders.

The eye-bar is the distinctive feature of the pin-connected bridge, and upon it depends, in a large measure, its economy.

A bridge which can be taken upon the staging in pieces and made self-sustaining between daylight and dark, would seem to need little more to be said in its favor, as compared with the tedious and expensive methods rendered necessary in the erection of riveted structures.

It must not be assumed, however, that American bridges are all pin connected. Many of the best railroads in the country prefer riveted bridges on account of their superior rigidity, particularly in short spans, and from the fact that they are not easily knocked down by derailed cars, a point which has not received the attention which it deserves. Our shop practice in riveted work is generally good, and we have effected some improvements on the European methods in general design; but we are yet deficient in experimental knowledge as to the value of the rivet connections, particularly when applied on one side of an angle bar, and we have not yet been able to avoid cross straining upon the chord at the intersection of the diagonals.

The English practice of drilling all holes on the ground where splices occur has not been found necessary here when a proper system of automatic spacing is employed.

The chief defects in our bridges have arisen from the weakness of the floor, and when it is remembered that locomotives have increased in weight within the past few years about 40%, and that the floor is subjected to its maximum strain every time that a locomotive passes over the bridge, it will be apparent that a decided increase in strength must be given to this portion of the structure, and in all probability it will be necessary to renew many of our earlier bridges in this particular.

Again, there should be more efficient provis-

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ion against disaster from the derailment of cars. The less wood we have on iron bridges the better; ties are, of course, a necessity, but they should be supported on at least four iron stringers, and be spaced 8 to 10 inches apart and secured against spreading. Joint boxes should be avoided. End posts should be continuous to the masonry supports and secured to the top chord and to each other by efficient portals. Horizontal bracing, to resist vibrations and wind pressure, should be made more effective than they are, particularly at the chord connections. There are many other minor details, it is safe to assume, which will be presented in due time, but upon the broad question of experimental information we must look for aid to every member of the profession.

A testing machine of the very best description, belonging to the United States government, is now in working order, at the service of all such as may desire to avail themselves of it. I believe the time has arrived when a committee of this society should be appointed for the purpose of inviting the co-operation of manufacturers in the effort to obtain more accurate knowledge of the metals and manufactured shapes which enter into our important structures.

Particularly is this the case in regard to the material we call steel. Of late, the manufacture of steel by the pneumatic and open-hearth processes has been undergoing a prodigious development, and we may now assume that a metal can be obtained by either of these methods more uniform in its character than the best iron yet offered in merchantable quantities, possessing an elastic limit of 40,000 lbs. per square inch, and an ultimate strength of 65,000 to 70,000 lbs. per square inch, and capable of being manufactured into any of the required shapes for structural purposes, at a cost which, taken in connection with the saving involved in dead weight, must insure its substitution for iron in the larger spans at least; and it is confidently asserted by those whose experience entitles them to speak with authority, that the day is not far distant when steel will be produced at a less cost than iron is at present by the hand-puddling process.

All the more important, therefore, is it that we should inform ourselves by the most thorough tests of the characteristics of steel, if we would maintain the high standard of American bridge construction. We have thus far applied this metal to but few structures. It has been used in the bridge at St. Louis, in the bridge at Glasgow and is now being used in the East river bridge, designed by Mr. Roebling, of 1,600 ft. span, and in parts of the Plattsburgh bridge, which you are invited to visit. It is hoped that the engineers of these pioneer structures will communicate to the society the information which their experiments have elicited concerning this material of the future.

The day cannot now be far distant when the merits and economy of the American type of bridges will be recognized by other nations. Already, notwithstanding the fact that labor and materials are cheaper in other countries than in this, we are able to compete successfully in Canada and South America. I believe that a well-directed effort to make known abroad what we have accomplished in this branch of engineering during the last 15 years would open a market for our bridges and bridge designs in Europe and in Asia.

Water Jet Dredging.

Among the numerous obstructions in New York harbor is, or rather was, Diamond Reef, since a considerable part of the rock has been blasted out. Enormous quantities of debris as well as a bed of hard pan consisting of boulders, gravel and sand remain to be removed. According to *Scribner's Magazine* this work is being very successfully done by means of water jets, in the same way as the gravel rocks are broken down in hydraulic mining. By means of a powerful pump on one of the dredging barges a large jet of water is forced through a hose and nozzle, which are secured in the desired position above the surface of the material to be removed. By means of this sub-aqueous jet the reef was rapidly broken down, and while some of the debris was carried out into deep water, an accumulation of sand, gravel and boulders, etc., soon blocked up the jet and stopped the work. A hydraulic ejector was then contrived consisting of a tube of large diameter, suspended horizontally some distance above the bottom, with one end pointing to the deep water beyond the edge of the reef. The other end of the tube was furnished with a nozzle placed inside it and connected by hose to the steam pump on the barge; the annular space between the nozzle and the tube was filled with a coarse grating to keep back the larger stones. While the first mentioned arrangement was kept in action stirring up the loosened material of the reef, the induced current created by the second jet was sufficiently powerful to sweep all the loosened sand and gravel through the large pipe, and discharge it into deep water. It was also found that if the outer end of the pipe was pointed upwards, and the stream of gravel and water was thrown clear of the surface and could be received in bopper barges, or disposed of in some other way. This idea of hydraulic dredging is not entirely new, but we are not aware of its having been employed before so successfully, or worked out in so practical a manner.—*Engineering.*

USEFUL INFORMATION.

The New German Preserving Fluid.

A new fluid, to be used for preserving dead bodies, has recently been devised, the patent for which the German Government has purchased and given to its people for their free benefit. Several criticisms upon the formula for its manufacture have appeared in foreign journals. Mr. Martenson, of St. Petersburg, says: Alum forms one of the constituents of the liquid; probably potassic alum is meant, and in place of potassa probably the carbonate. But under the circumstances, all the alumina of the alum is precipitated, so that the liquid does not retain any in solution. On preparing large quantities of the solution, the labor of straining or filtering from the deposited alumina is very onerous. It is much better to omit the alum, and to substitute at once that substance which was produced by it in the original liquid, namely, potassium sulphate. A portion of the alum may be replaced by borax, so that the constituents will be the following:

	Parts.
Water.....	620
Potassa.....	10
Sulphate of potassa.....	4
Salt.....	5
Nitrate of soda.....	3
Carbonate of potassa.....	9
Arsenious acid.....	2
Glycerine.....	300
Alcohol.....	50

The arsenious acid and carbonate of potassium are dissolved together by the aid of heat, and added to the solution of the other ingredients.

CLOTH FROM THE DOWN OF BIRDS.—An ingenious Frenchman, M. Thierry Girees, has devised a method, and invented machinery, for the manufacture of cloth from the down of birds. The down may be worked either by itself or in mixture with wool, silk or cotton. The goods produced, whether exclusively of down, or mixed with fibrous material, present entirely novel features and characteristics. It is found that the down, whether of the swan or any other bird, will take any shade of dye, from the most delicate to the deepest color. The cloth is very warm, more so than woolen, and may readily be made impervious to moisture. It has been found best, as a general thing, to mix the down with some fibrous material, and for most uses wool is preferable. Its preparation with wool, in order to make an intimate mixture, oleic acid is used, in certain fixed proportions, during the first stages of the manufacture—in sorting and carding. It is carded, spun, woven, filled and tacked down by special machinery, invented for the purpose by M. Girees. The cloth is much like velvet; the "nap" of the mixed material, after it is finished, consists mostly of down. Shearing and dyeing is effected in the usual way, and, as already stated, this "down" cloth takes any shade of color. *L'Ingenieur Universel*, of July 2d, gives an illustrated description of most of the machinery employed in this new article of manufacture.—*Californian for September.*

HINTS FOR PRESERVING FRUITS.—A useful hint to cooks was given at a recent sanitary convention in Grand Rapids, Michigan. It was pointed out that by adding sugar to sour fruits, during the cooking process, the greater part of the cane sugar was converted by the aid of the acid into grape sugar, which does not possess half the sweetening power. By cooking the fruit first, and then adding the sugar to an agreeable sweetness, a very great deal of sugar might be saved. Raspberry, strawberry, and cherry syrups of the German Pharmacopoeia have to be made by bruising the fruit and letting the juice be strained off and filtered. A better and safer way is to add at once to the freshly bruised fruits five to six per cent. of alcohol, to let the whole stand for some days, decant and filter. Lastly, boil up once to remove the greater part of the alcohol. Syrups made with juice prepared as above retain in a remarkable degree the odor and taste of the fresh fruits.

THE PHILOSOPHY OF DYEING.—A French expert has recently been making some very interesting experiments upon animal and vegetable substances, with the view of ascertaining how coloring matter is taken up by the substances which are being subjected to the dyeing process. It was found that the action depended largely upon the capillarity of the fiber or other substance treated. Microscopical examination of infusorial earth showed that the coloring matter entered the capillary tubes of the infusoria, and attached itself to the inner surface of the walls. So with fibrous material. The more fully the capillary construction was developed, the more perfect is the capacity of the substance to receive colors. This fact will be found of special importance in the art of dyeing, and affords an explanation of the reason why some substances receive dyes more readily than others.—*Californian for September.*

TO RESTORE RANCID OILS.—Fixed oils may be deprived of rancidity by adding a small quantity of sweet spirit of niter and shaking well, and afterward heating slightly till the odor of the spirit has disappeared.

TO CHANGE THE COLOR OF FLOWERS.—The natural colors of flowers may be changed by exposing them to the diluted fumes of ammonia. Most of the blue, violet and light crimson flowers turn to a splendid bright green. Dark crimson clove pinks turn black, other dark red flowers turn dark violet, all white flowers turn sulphur yellow. This change of color is especially beautiful when they are variegated or the single petals possess a different color. As soon as the new color is fully developed, the flowers must be dipped at once in cold water, when they will keep their new shade for two or six hours; by degrees then their natural color returns. If flowers be exposed to the vapors of ammonia for one or two hours they turn a dirty chamois, which is permanent. Blue, violet and red asters are dyed or turned intense red when they are exposed to the fumes of muriatic acid gas; it takes from two to four hours or more before the shade is fully developed. The flowers are then removed to dark, cool rooms to dry.

UTILIZATION OF WOOD SHAVINGS.—From wood shavings and paper Herr Heilmann makes plates, dishes, etc., as follows: Selected plane shavings are bound into bundles, and steeped in a bath of weak gelatine solution about 24 hours, then dried and cut into suitable lengths. Plates are cut of strong paper or thin pasteboard, of the size of the objects to be produced. These are moistened with a liquid consisting of weak gelatine solution with soda water glass and pressed in heated metallic molds. After drying, the pressed paper objects are coated on both sides with an adhesive material made of five parts Russian gelatine and one part thick turpentine; the shavings are applied to them and the whole is subjected to pressure. Wood shavings alone would, because of their unequal thickness, present uneven surfaces. The objects are now cut, if necessary, dried and varnished.

TO PRESERVE AND RENOVATE RUBBER INSTRUMENTS.—It is well known that many articles and instruments made of rubber are apt to become dry with time, and to crack, grow brittle, and lose all elasticity. According to a Russian journal, this may be prevented by the use of a simple mixture of one part aqua ammonia with two parts of water; in which the articles should be immersed for a length of time varying from a few minutes to one half or one hour, until they resume their former elasticity, smoothness and softness.

CABBAGE TEST-PAPER.—A useful test-paper may be made by boiling a pound of the leaves of red cabbage in one pint of water for some time, and then straining the blue liquor through muslin. Evaporate to about half its bulk; place layers of white blotting-paper in the liquid, and then hang them up to dry. Acids change the blue color of the paper to red, and alkalis turn it green. This is a very good substitute for litmus paper.

GOOD HEALTH.

Hints on Sea-Bathing.

August is the month for sea-bathing, which, if properly managed, is one of the most healthful and invigorating of exercises, though its good effects are often neutralized through ignorance or carelessness. The following extracts from Dr. J. H. Packard's *Sea-Air and Sea-Bathing* (one of the "American Health Primers") furnish a very good summary of rules for the guidance of the unprofessional reader in this matter:

How Long to Bathe.—It is quite absurd to lay down positive rules as to the time people should remain in the water, since they do not carry watches in with them. And any day's experience on the beach in the season will show a great many bathers sporting in the water for half an hour or an hour, and even longer, without any perceptible ill effect. It is quite a common practice among the young folks to go in, take a bath, come out and lie on the sand, and go in again, perhaps a number of times. The powers of endurance vary greatly, and it is well known that swimmers have sometimes remained in the water for many consecutive hours without harm.

There can, however, be no question that for sanitary purposes, and as a matter of prudence, it is better to take the bath, and then to leave the water for the day.

What is wanted in ordinary sea-bathing is to carry the chilling of the body only so far as to promote the subsequent reaction. The first sense of cold on entering the water is soon followed by the feeling of returning warmth; and this continues for some little time, to be again succeeded by a sense of chilliness. This second cooling is accompanied by diminution in the activity of the circulation, shown especially by blueness of the lips or fingernails; and this should invariably be regarded as a signal for leaving the water at once. To wait until the teeth chatter, and the skin of the fingers becomes shriveled like those of a washerwoman, is in a high degree imprudent.

For those who have young children or invalids under their charge, and who are able to observe and regulate the exact time of their stay in the bath, it may be said that this may be according to the condition of the skin, somewhere between 2 and 15 minutes. It is always safe to err on the side of prudence, and to cut

the bath needlessly short rather to prolong it at any risk.

Perhaps it need hardly be said that the colder the water is, the less time should be spent in it. When the air and the water are both cold, the duration of the bath should be correspondingly diminished. This condition of things increases the danger of shock and of insufficient reaction.

One should enter a sea bath comfortably warm and exercise actively during the stay in the water. The temporary chilling of the surface will then give place quickly to a glow, which may be kept up or even increased by thorough rubbing.

How to Bathe.—There is very seldom opportunity for diving into the sea, and only a very small number of bathers are expert enough to do it. The best plan is to walk or run rapidly into the water, wading out at once far enough either to dip the whole person, head and all, or to allow a wave to break over the bather. Some like to have a bucket of sea water dashed over them before going in. Once in the water, and thoroughly wet, one need only keep moving, occasionally going under a wave, as long as the water is agreeable, and there is no sense of chilliness.

Swimming.—It is not safe to swim in the sea when the tide is running out, as then it is difficult to make headway towards the shore. It is not safe to swim when there is a heavy surf, as even a good swimmer may be so confused and baffled by waves breaking over him as to lose his presence of mind, and perhaps swim seawards instead of to the shore; or he may be so exhausted by the force of the water as to sink.

It is not safe to swim when there are strong currents running in the general line of the shore, as these sometimes set outward enough to keep the bather in deep water longer than his powers can hold out. Should he find himself in such a current, he should never try to make head directly against it, but should swim diagonally towards the shore, and, above all, should try to keep his presence of mind and save his strength.

On leaving the surf bath it is always best for the bather to wash his head with fresh water, so as to free the hair from salt, which would otherwise make it very stiff and harsh. At many places there are connected with the bathing houses hydrants at a suitable height, by means of which this may be very conveniently done.

Sleeping Position.

The food passes from the stomach at the right side, hence its passage is facilitated by going to sleep on the right side. Water and other fluids flow equally on a level, and it requires less power to propel them on a level, than upwards. The heart propels the blood to every part of the body at each successive beat, and it is easy to see that if the body is in a horizontal position the blood will be sent to various parts of the system with greater ease, with less expenditure of power, and more perfectly than could possibly be done if one portion of the body were elevated above a horizontal line. On the other hand, if one portion of the body is too low, the blood does not return as readily as it is carried thither; hence, there is an accumulation and distention, and pain soon follows. If a person goes to sleep with the head but a very little lower than the body, he will either soon waken up, or will die with apoplexy before morning, simply because the blood could not get back from the brain as fast as it was carried to it. If a person lays himself down on a level floor for sleep, a portion of the head, at least, is lower than the heart, and discomfort is soon induced; hence, very properly, the world over, the head is elevated during sleep. The savage uses a log of wood or hunch of leaves; the civilized, a pillow; and if this pillow is too thick, raising the head too high, there is not blood enough carried to the brain, and as the brain is nourished, renewed and invigorated by the nutriment it receives from the blood during sleep, it is not fed sufficiently, and the result is unequipped sleep during the night, and a waking up in weariness, without refreshment, to be followed by a day of drowsiness, discomfort and general inactivity of both mind and body. The healthful mean is a pillow, which by the pressure of the head keeps it about four inches above the level of the bed or mattress; nor should the pillow be so soft as to allow the head to be buried in it, and excite perspiration, endangering ear-ache or cold in the head, on turning over. The pillow should be hard enough to prevent the head sinking more than about three inches.—*Hall's Journal of Health.*

INSANITY A BOON.—A German physician considers insanity in the light of a boon. This is certainly a novel view. He holds that the loss of reason lands the sufferer from a sea of trouble into one of comparative calm—often into one of decided happiness; and attempts to restore such a person to sanity would be cruel rather than kind. Moreover, he insists that without a certain amount of insanity success in life, in the ordinary acceptance of the term, is quite impossible. All eminent men, he contends, are decidedly more or less mad. Many of them are dangerous monomaniacs whom it would be decided on public grounds to shut up, but who nevertheless achieve grand careers, and are credited with doing a vast amount of good. The false notion he attributes to the fact that the greater mass of mankind are also insane, and quite unable to distinguish between good and evil.

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Business Announcements.

Dividend Notice—Eureka Con. M. Co.
Iron Pits Wanted—H. C. Perkins, French Corral, Cal.

The Week.

The Industrial Exhibition at the spacious pavilion of the Mechanics' Institute is now fairly under way, and is attracting daily and nightly a large body of visitors. Apart from the interest which the ordinary visitor feels in the display of the varied products of our industrial establishments, a promenade around the illuminated hall, during which the curious eye is attracted at almost every step, is a source of agreeable surprise, pleasure and instruction. As a place of rest or amusement for the tired man or woman, there is at present nothing in the city half so inviting and refreshing. Then it is such a pure delight to the little folks that, if we could have our way, the fair should be open for ever.

On Tuesday, the 17th inst., a very destructive fire occurred at Eureka, Nev., and burned over an area almost identical with that destroyed by the fire which took place there a little over a year ago. The latest accounts represent that about 300 houses, many of them business establishments, were destroyed. An area equal to 50 acres, situated in the very core of the town, was literally swept by the flames. The loss is estimated at \$750,000, which is covered by an insurance of \$150,000. Eureka is among the most productive mining camps of Nevada, and its business is intimately connected with this city; and that consideration will help to excite the sympathies of our citizens in behalf of the sorely stricken town.

In recording the salient incidents in our industrial progress, it is pleasant to note the enterprise of an incorporation at Oakland, the object of which is to manufacture woolen goods—an industry which is peculiarly adapted to California. The company will begin operations about the 1st of November, and will, at such time as its works shall be completed, give employment to 600 or 800 men and women and boys and girls.

EXTRAORDINARY MILEAGE.—Mr. Watkey, master of machinery of the New York Central and Hudson River railroad, reports that locomotive No. 569, running between Syracuse and Buffalo, with two crews of men, made in 10½ successive months the extraordinary amount of 95,052 miles.

The Plague of Experts.

For many years the mining experts of the Pacific coast have been a distinct and curious class. The larger part delight in the title of "professor." This class embraces every nationality, and almost every trade and calling. As the mining region expanded under new discoveries, fresh experts appeared and swelled ranks that were already crowded to plethora. The supply more than kept pace with the demand. Perhaps the largest and most sudden accession to the multitude of mining experts occurred in Colorado upon the discovery of the mines at Leadville. That was an inviting field, and there as nowhere else before the crop of self-made "professors" and "mining engineers" and "experts," seemed to spring out of the ground or to fall from the clouds. Their name was legion, and their performances marvelous beyond credulity. One of the strongest and most effective points of the mining expert is figuring on "ore in eight," and that trick has loosened the purse-strings of many a doubting Thomas among Eastern capitalists. The *Colorado Miner*, published at Georgetown, says that a "genius of this class lately reported on a mine in Clear Creek county, and after several pages of transcendental hooch which had been pumped into him for information about the property, he made the statement that over \$1,000,000 worth of ore was in eight. If he can take out \$10,000 in six months with a profit of \$5,000, the miners of this county will be agreeably surprised. The property is a good one, needing only a large working capital for extensive development, but such reckless and absurd statements only harm the mining interests."

In this city only a few months ago a ready-made "professor" from Leadville, who had been brought from New York as an expert to examine and report upon a gold mine in this State, which had been offered for sale at a round price, declared to a trained and skillful mining engineer and metallurgist, in his own laboratory, that there were "no minos in California—no mines on the Pacific coast. If you want to see mines you must go to Leadville." He uttered this astounding judgment with an easy confidence, which left the hearer in doubt of his own sanity. This class has been the means of placing many a worthless mining claim upon the Eastern market, to the serious detriment of the great and beneficent mining industry of the country.

These "professors" do not thrive in California or Nevada quite so well as they did formerly. Our people have acquired a large experience in mining affairs, and are not so easily duped by the reports of unscrupulous and ignorant pretenders; besides this fact there is a class of really accomplished mining engineers who entered the field fully equipped, with a thorough scientific training, and who have had since the most varied experience in our boundless mining regions. The experience and experiments of these men, both in the field and in the laboratory, have added largely to our scientific knowledge. It is likely that some of these trained engineers have made mistakes. It would be wonderful if they had not. We know it is the habit of some people to speak slightly of these trained experts as mere hook men and theorists, and to express a decided preference for what they are pleased to term "practical" men. After all science is simply the recorded result of the most intelligent practice; and the man who has learned, what has already been accomplished in a given field, has certainly a great advantage over one whose knowledge is based chiefly or altogether on his own narrow experience. Of all theorists commend us to the practical man. He can out-theorize the fullest book man of them all. We recall an incident related by Prof. Siliman while in eastern Nevada on professional business several years ago. His appearance in the camp excited great expectations, and a self-appointed committee of the over-anxious showed a disposition to take possession of him. But the shrewd gentleman eluded the thrall, and went out into the hills to see the mines and to meet the miners face to face. He spoke to a solitary miner who was working in a shallow incline, and, seated upon pieces of rock, they were soon engaged in conversation upon the mines of the district. The miner, who was a plain sensible fellow, detected the calmer of his companion, and told him bluntly that he didn't "go much on hook men; they're all theory. Give me the practical man." The professor laughed heartily, and reminded the other that, for a practical man, he had advanced more theories in less time than any man, whether scientific or practical, whom he had ever met. Quite unconsciously the miner, who affected to condemn theory, had offered theories as freely and readily as though he had been an erudite mining engineer.

A little reflection would soon dispel the prevalent opinion respecting practical and scientific men; would mark the difference between men who have been trained for a given pursuit, and those who have had no training, and are generally characterized as "self-made." Every skillful mechanic in our shops knows the value of training. One does not hear much of self-made machinists or joiners or other skilled artificers. Skill follows trained methods and practice. What would happen to the novice—the self-made man—who should engage in a contest with a trained and skillful lawyer or doctor, pugilist or wrestler, blacksmith or carpenter? Why, he would be beaten every time. We

properly lay stress upon a man's experience: how much abler is the man who, in addition to his own experience, is fortified by the best experience of the world? That is simply the difference between the so-called practical man and the disciplined expert—the man of hooks and theories. Heaven-horn experts are seen but seldom. There are remarkable men—the architects of their own fortunes—who in spite of the want of special training have achieved brilliant distinction in the highest professions. Such men pluck renown from adversity. We have in our thought the distinguished engineer who recently came to this coast, who presents a shining example of a self-made man.

Pacific Coast Fish.

At the last meeting of the California Academy of Sciences, Prof. Jordan, who is collecting data in connection with fish matters on the Pacific coast, for the U. S. census, presented to the museum a donation of 18 species of fish. He said the Commission had now about completed its labors here, and he intended soon returning East. He said, in a thorough exploration of the fish of our coast, they had obtained 270 species, of which 200 were previously known to science, 25 were known through Mr. W. N. Lockington, and about 45 new species he had discovered. He said we have 19 species of sharks on the coast, including nearly all the known varieties. Last spring he caught, in Monterey, a very enormous man-eating variety of sharks; one was taken at Soquel. Their teeth were large, and the animals are very dangerous. They measured from 23 to 24 ft. in length, and weighed full 2 tons apiece. The Professor has preserved their jaws. He said he knew of another and larger variety of shark found here, averaging 32 to 33 feet in length, and weighing three tons apiece, which had but small teeth, was quite lazy, and not at all dangerous. He then spoke of the well-defined limits of

Different Fish Systems of the Coast;
One set extending from Point Conception as far north as Monterey bay, which are very numerous, and rarely come farther north into our colder waters, although a few sometimes reach San Francisco bay. The second set extend from Monterey to Puget sound; and a third set are found wholly north from there on toward the Arctic. Monterey bay is middle ground where the fishes from north and south meet, and no locality on the Atlantic sea-coast is so rich in species. It has about 130 species, and San Francisco has the same. Santa Barbara has 95 kinds, as our rock cod and flounders do not go so far south. At San Diego there are found 80 species. The great tribe of so-called perch on our coast are, none of them, the true perch. In Puget sound they found about 90 species, all of which were northern varieties. The Fish Commission have made very thorough work of it, and left no opportunity unavailing of to make their report complete. In the Columbia river there are taken annually a million and a half of salmon fishes, averaging from 25 to 30 pounds each. In San Francisco bay there are taken and marketed annually from seven to eight million pounds of all varieties of fish. Professor Jordan gave it as his deliberate and well considered opinion, as a scientific expert, that

The Salmon of this Coast
Are in no wise inferior to any salmon caught on the Atlantic. This he says after a most elaborate and exhaustive study of the salmon along the entire coast at all seasons of the year, where they are found in a great variety of conditions. He said the red and white flesh of salmon was found in the same varieties of fish, and indicates difference of condition, and not variety of species. We have only five species of salmon on the whole extent of our coast, all included. When they are in superior condition their flesh is a deep red, and old males, as they approach the spawning age and season, finally become nearly white. They are then out of condition for eating. In the autumn they undergo certain rapid changes of condition; their form becomes distorted, their backs arched, and their whole form becomes deeper and less symmetrical, quite unlike their regular and beautiful figure in spring. Their jaws enlarge and teeth change in form and number. They run up rivers and the females spawn, after which all die. The reason of this universal death after the spawning period is not yet fully determined. Their life history, however, is: They are hatched in clear water, in the shallow streams, brooks and rivulets of the interior connecting with the ocean. They descend to the sea when three to four inches long, and after a long absence, return at about the age of four years. When they approach the coast they become attracted by the strata or currents of fresh water flowing from rivers.

When at Sea They Feed Freely and Bite Vigorously

At a hook, but as soon as they enter fresh water and mount up the rivers, they cease entirely to eat anything and therefore never take a hook. When thus caught their stomachs are always empty. As soon as they begin to fast, their features begin to become sharper, and they rapidly become what fishermen call dog-salmon. They appear then impressed with an irresistible desire to penetrate fresh water streams as nearly to their fountain-heads as possible, and follow the sources of the Columbia river as far as Montana. During this rapid

journey they distribute their spawn and keep on going until the water is so shallow they can barely crawl up stream farther; then they hatter themselves up, and in October, having spawned, all die, and none ever return to the sea. Prof. Jordan thought they died from pure exhaustion, as all become mottled or less bruised by rocks, and none have tested any food since leaving the ocean. Ventura river is the farthest south that any salmon run up rivers, as few rivers below these have any direct outlet to the sea, but run through such obstructions as sand-bars.

At Columbia river, from April to July, there are from 1,500 to 2,000 boats out salmon fishing all the time, extending from the bar clear up to off Mount Ranier, forming a perfectly impenetrable web of nets. Some adventurous fisherman, venturing too far out to sea on the bay, is drowned almost weekly in the height of the season, when the canneries are harvesting their annual fish crop.

Future Fish Supply.

Prof. Jordan was asked his opinion if such excessive fishing was likely to endanger the future supply of fish, and said that if they ceased catching salmon after July enough would ascend the river later than that to fully stock the river with the required amount of spawn necessary to keep up the usual supply, for in the matter of fish-spawn nature is very hountiful in her supplies.

The remarks were listened to with marked attention, and are of especial interest, as giving the well digested opinions of an eminent scientist on the matter of a very important item of our food supply.

The Ontario Silver Mine.

This remarkable silver mine in Utah Territory was scarcely known four years ago, and yet so valuable is its large ore body and so skillfully has it been explored and worked, that the product already exceeds \$4,000,000. A recent number of the *Salt Lake Tribune*, gives an interesting account of the Ontario, which we briefly summarize. Notwithstanding the large product of the mine, there has never been a time when more than 25 men were employed in extracting ore. The ore body is large and easily mined. The volume of water is great, indeed, it costs twice as much to take the water out of the mine that it does to extract and mill the ore. Owing to the superabundance of water the pumping machinery is both heavy and costly. The heaviest pumps in the mine are in the 500-ft. shaft. The water is hoisted from the 500-ft. level up to the 100-ft. level, where it passes out through the Union tunnel to the surface. One pump in the 600-ft. shaft also throws water to the 100-ft. level. The other small pump in the new shaft throws to the heavy pumps on the old shaft, a connection being made between the shafts. On the 700-ft. level, as soon as the station is out, a heavy Knowles pump is to be placed and is intended to do duty until the Cornish plunger is ready to take its and the other pumps places. This plunger will be in place this fall and some idea of its magnitude can be formed from the fact that it will cost, at the lowest estimate, \$150,000. It is a vast piece of machinery which lifts water from level to level, and with each motion of the plunger the water on each level is taken up to the next where it is received by tanks. It will require an engine of 150-horse power to do the work. In order to furnish steam for lifting the ore, waste and water from this great fissure, there are at the present time 12 large boilers, the largest in use in the Territory.

Experience shows that as depth is attained in the mine the ore becomes not only baser, but richer. The ore, which may be characterized as refractory, is treated at the mill—one of the most thoroughly complemented on the coast—in a highly scientific manner, and yields a good and satisfactory percentage. The mill has 40 stamps, and is easily capable of reducing 50 to 60 tons daily. This amount of ore is readily extracted, and the foreman of the underground works informed the *Tribune* correspondent that it would be an easy matter to supply an 80-stamp mill for three years from the ore already in sight. There are at the mill 3,000 tons of ore held in reserve, so that in case any mishap should occur, either to the machinery at the mine, such as a breakage of any of the pump columns, or a cave in the shaft, the mill can keep steadily at its work turning out the hullion until the necessary repairs have been made. From the outset the management of the great property has been admirable, and the shareholders of few incorporated companies have received such uninterrupted satisfaction as those of the Ontario.

COMPARATIVE HEAT OF ARIZONA.—A Tucson correspondent of the *Record-Union* has this to say of the heat in Arizona: The months of June and July are the hottest months. This year the thermometer has at no time during these months, or at any other time, risen to over 110°, according to the signal station report. Ordinarily the thermometer ranges from 85° to 100° during the warmest portions of the day. I have found no heat in the Territory as oppressive as that of Marysville and Oroville, California. The nights are cool and delicious; many persons sleep in the open air; whole families occupy the sidewalks, perfectly secure from all intrusion.

Leaf-Variation in Acacia Trees.

[Written for the Press by W. G. KERR.]

Of all the families of plants, the order of *Leguminosae* or pulse family, perhaps, stands second to none in usefulness and number of members except the *Gramineae*. Among its

vast tribes we find the most diversified forms, from the tiniest little herbs that creep along the ground to the mighty tree of this forest. Our succulent clovers give us the best fodder for our domestic animals, and peas and beans are among the strongest food for men. From the pods of the tamarinds cooling drinks in the hot countries are prepared, and from the similar fruit of carob, mosquitos and screw bean we obtain in the most arid regions food for man and beast. From the indigo and campêche tree we get our dyeing materials, and, finally, from some of the acacias we receive the best of gum, tannin, as well as the hardest of woods. But, putting aside all these direct useful properties, evident to every man, this remarkable family is of special interest to the botanist.

That those readers who are little familiar with the subject of this article, the heterophyllism* of the acacia tribe, it becomes necessary to review in short some of the characters of the pulse family. In spite of its large size, this family is what might be termed a natural one—that is, its limits are pretty well defined, though divided in three suborders—the *Papilionaceae* or pea family, the *Cesalpiniaceae* or brasilletto family, and the *Mimosaceae* or acacia family. Though each has its special characters, they are all known by the fruit, which is termed a legume or a pod that is formed by one pistil which dehisces or splits in two valves. It must, however, be remarked that there exist legumes that, owing to their peculiar development, as the screw bean, the carob, etc., do not open at all. But another feature that may be said to be one of their chief characteristics is the compound leaf. A compound leaf in its strictest sense is a leaf which has two or more distinct blades, but, as later shall be explained, we may even term a leaf with one blade compound, if it is articulated or jointed to the stalk. The bipinnate, or compound leaf, with only two leaflets, is rare. It occurs in a tropical tree named *Bauhinia*, and is foreshadowed in the common red bud or *Cercis occidentalis*. The ternate or trifoliate leaf is the familiar leaf of the clover tribe, and the beans and peas have a truly pinnate leaf. In the honey locust we have it double pinnate, and in some *Mimosae* the leaflets become so numerous that it becomes a difficult task to count them. Some leguminous plants, on the contrary, as for instance the so-called broom (*Spartium*), displays when young three foliate leaves, but later produced leaves have only one of these, and the plant becomes gradually leafless, the green stems performing their office. In various Australian plants, as for instance the *Templetonia*, a shrub with scarlet pea flowers, not uncommonly planted, there never appears more than one leaflet. In the *Parkinsonia*, a thorny shrub of southern California, we have a compound leaf which has its mid rib very much widened and the leaflets very inconspicuous, and very often drop off, seemingly, without hurting the mid ribs that remains on for a long time afterwards. I have dwelled on these, as it may perhaps seem trivial particulars, that come later idea may be better understood, and shall now pass to the direct subject of this article.

Many are familiar with the golden, blooming, fragrant acacia, planted as it is everywhere in one of its endless forms. Here it is *mollissima*, with its dark bluish foliage, or *dealbata*, covered with fine silvery bloom that, as a mighty tree, shades the house; or it is *latifolia*, with its stiff upright foliage flourishing on the poorest spot in your garden; or it is *armata*, with its little leaves and big thorns, that ought to be, if it is not, part of your hedge; or it is *verticillata*, with the sharp leaves arranged in a whorl; or it is perhaps *calamifolia* or *squamosa*, with its long needle-shaped leaves; or it is perhaps *cul-triformes*, with its trimmular, bluish foliage and slender branches hurled down with golden yellow flowers; or perhaps still another of this

vast tribe. They are all acacias; their flowers and fruit (pods) tell us; but where is the compound-leaf like in *Mollissima*, and what resemblance do these sickle, needle or triangular vertically-placed leaves bear to the fine mimosa-like leaf of the former?

No doubt you have occasionally seen planted

ever, you find a peculiar development (Fig 4); the mid rib evidently has expanded and part of the leaflets have dropped off. In the one higher up (Fig. 5) there has only two remained suspended, until, finally, in Fig. 6, you have none left, and in Fig. 7 is seen the permanent leaf-form in the blooming twig. You have now seen

in *melanoxydon* when young can be seen on the old tree. The phyllodious group of acacia are almost all Australian, and add to the peculiar charm this country has to the botanist, and they were among the strange looking plants that astonished the early discoverers and caused the name of Botany Bay. In its most remark-

able flora and fauna many naturalists have thought they found in Australia a remnant of a former period of the earth. The great botanist Sir Joseph Hooker, however, who has given the botanical part of this question a great deal of investigation, declares that he cannot find sufficient ground for the belief. But he dwells on one point that seems to speak for those views. He found by comparison that the western and eastern parts of Australia have comparatively few species in common. This is very strange, as no mountain chain separates them; but what is still more strange, western New Holland has many more genera in common with Africa than the eastern, and in the same manner the southeast has South American forms not found in the west. To meet therefore on the Isle of Bourbon, not very far from Africa (comparatively speaking) and on this side of Madagascar, with a phyllodious acacia of the peculiar Australian type, which is, as remarked, not found outside of that part of the world, is certainly very interesting; and when again we seem to find almost the same form in the Sandwich Islands, we naturally wonder

still more. There is a peculiar charm in pondering over the history of plants, hidden as it is in the dark of the past. We rejoice when finding in the grand volume of nature, pages where the letters still are plain and visible. Such a page is the *Acacia melanoxydon*, it lies open for you. Read the story which the plant relates.

You see before you the exile of another country. That world we once inhabited has almost disappeared. Where now the waves roll was once an immense continent larger than any now in existence. From India to far south in the Pacific it stretched, and from the shores of Mauritius to the Hawaiian Islands. It was the home of rich and luxuriant flora. In this immense country, dotted with large, clear lakes as those of North America, with rivers deep and swift, flourished together with beautiful trees the great tribe of acacias, mingling their delicate foliage with the feathery crown of the cycades in the halmy air. In the grassy plains, now deserts of *spinifex*†, there was an eternal spring. Huge kangaroos compared with which those of the present are but a weak progeny, found here abundance of food even to satisfy their enormous appetite. But alas, the genial climate of this region should not last. As the greater part of the continent gradually sank into the bosom of the sea, another was slowly raised and mountain chains were heaved up. The beds of rivers were changed and the beautiful clear lakes lost their affluents and filled with salt. They gradually became dry, and from their empty basin, heated by the tropical sun, the hot winds commenced to blow fury as from a furnace. Then our struggle commenced; death and disease thinned our ranks. The scorching wind and burning sun parched the delicate little leaves, and they fell to the ground, only the leafstalk remaining pointing heavenward for relief. It was in vain our innumerable flowers scattered broadcast their millions of seeds. The little plants brought forward their delicate little leaves, their inheritance from their fathers, all for naught. One by one they dropped. For a long time this continued until all but a few became leafless. Only my ancestors and nearest relations still huddled on, until at last they also had to yield to the rigor of the climate.

But as the sea expanded and surrounded the island you now call New Holland, humid breezes brought relief to the well-nigh exhausted acacia, and they felt it. Their leaves once lost they had no power to recover, but the leaf-stalks commenced to expand each in their own peculiar fashion. Some became broad and huge, like wings; others became rounded and elongated, like a pine needle, others triangular shaped; while those who, in the hard struggle, had been forced on thorns, hardly managed

† Name of grass covering immense barren regions in the interior of Australia.

CONTINUED ON PAGE 124.



HETEROPHYLLISM OR LEAF VARIATION OF, ACACIA TREES ILLUSTRATED.

in the garden or street a remarkably symmetrical acacia with straw-colored flowers and almost resembling the Monterey cypress in shape; *melanoxydon* is its name, and it is one of the most useful of its tribe. If it is a young tree, you will here receive answer to your question, in what relation the sickle-shaped vertically-

how gradually the compound leaf has developed to perfection, and how it just as gradually has emerged into a form as peculiar as that of any or all the forms I named before. Few are, however, the examples where as beautiful an illustration of the most remarkable phenomenon can be observed. In the most of the



LEAVES AND FLOWERS OF ACACIA MELANOXYDON.

placed leaves stand to the mimosa leaf. Possibly the two first leaves (Fig. 1) have dropped off. At this point all the acacias are alike. A bipinnate-compound leaf has succeeded the seed leaves; few of them ever produced more than two pairs of these. Higher up the stem you will find a more developed leaf with four divisions (Fig. 2), and still higher up you have the perfect leaf, almost like that of a mimosa or *Acacia mollissima* (Fig. 3). Close to this, how-

species the *phyllodia*, as the vertical expansions are termed, succeed almost abruptly the pinnate leaf. Only two species, so far as I know, besides *melanoxydon* display this peculiarity; the one is *heterophylla*, a native of Isle of Bourbon, an African island, and *Kau*, a very close relation, almost identical with it, found on the Sandwich Islands. These two widely-separated forms bear during all their lifetime two kinds of foliage, and this change observed

*Heterophyllism from the Greek *heteros*, various; *phyllon*, leaf.

THE INDUSTRIAL WORLD.

Enormous Grain Elevators.

So vast has become the grain trade of New York that it is the belief at the Produce Exchange that the great bulk of the shipping trade of the west will center there. They count upon six additional steamers, at least, a week, leaving that port within the next year, entirely devoted to the grain, cattle, and meat traffic between this country and Europe. To meet the demands of the grain trade, enormous elevators have been built with such facilities that as many as 40 and 50 cars can be unloaded at one time. The following facts concerning them will give some idea of the business done: The elevator built by the Erie Railroad Co., and only completed very recently, has a capacity for 1,500,000 bushels of grain, and is able to unload a car in the extremely short time of three minutes. It is situated on the New Jersey side of the North river, only a short distance from Pavonia ferry. It is claimed by the company to be the largest and most complete in construction in the country. The dock on which it stands is 1,750 ft. long, 100 ft. wide, the elevator itself being 375 ft. long, 80 ft. wide, 165 ft. high, with a stock of 180 ft. The machinery is run by two 250-horse power engines, and the elevator can receive and unload 40 cars at one time by means of steam shovels, at the rate of three minutes, and can load four ordinary steamers in four hours. The cost of the structure was \$750,000.

The immense elevator reposes upon a foundation of granite pillars 16 ft. high and 8 ft. square. The large elevator built by the Pennsylvania Railroad Co., is located at Harrison's Cove, Jersey City, and is so constructed that it will hold more grain than that of the Erie. Bulk will have to be broken only once from Chicago or St. Louis to its final destination.

Those built by the New York Central and Hudson River road, as before stated, are at 61st and 63d streets, North river. Both are capacious. The second can unload and receive a cargo at the same time. 400 cars can be unloaded in a day and 500,000 bushels shipped into vessels. Two of the largest ocean steamers can easily lie alongside the dock of the second elevator and be loaded or unloaded at the same time. The building is 355 ft. in length, 70 ft. in breadth, and 131 ft. to the ridge of the roof, with a dock on both sides and on the river front. It is built of timber laid and spiked in what is known as the crib form, and over 3,000,000 ft. of timber was employed in its construction. It has no less than 20 shipping bins, each holding 1,000 bushels of grain, and can be cleared at the rate of 7,000 bushels an hour. The cost is close upon \$500,000.

THE PULLMAN PALACE CAR CO.—One of the largest manufacturing establishments in the country is now being built by the Pullman Car Co., at a cost of \$1,000,000. It is located near Chicago, on the Illinois Central railroad, three-fourths of a mile south of the Kensington station. About 150 acres is included in the site, and will be laid out in drives and lawns, with two attractive parks. On one side is water transportation by Lake Calumet, and on the other the Illinois Central railroad tracks, while but a short distance away is the junction of the innumerable roads leading into Chicago. The structures will be of brick and stone, having 1,130 ft. of frontage and facing the double track of the Illinois Central railroad. They will consist, first, of two parallel buildings for erecting shops 690 ft. long and 87 ft. wide. The central section, containing the offices and store-rooms, will be 100 ft. long and 100 ft. deep, three stories high, with a tower rising to a height of 146 ft. In the rear of these will be a series of four buildings, covering an aggregate frontage of 1,047 ft., with a general depth of 200 ft., forming the wood machine shops, blacksmith shops, varnish-room, repair shops and two erecting shops. Still back of these will be another erecting shop, 474x86 ft., a dry kiln 150x80, and a foundry 130 ft. front and 200 ft. deep. These buildings are compactly located as regards each other, making them convenient of access. The erecting shops will have stalls for 50 passenger cars and 100 freight cars at one time. Tracks running between the various shops will be provided with numerous turn-tables, so that cars can be run in and out without switches.

The Edison telephone connects the British Parliament buildings directly with the London newspaper offices, so that the debates can be reported and put in type an hour earlier in the morning than heretofore. It was but lately that the London Times was printed on a Yankee press; now it is a Yankee that helps on the chin music in Parliament, and we half expect that they have a Yankee type printing machine connected with it, one that is claimed to set up 100 lines an hour, instead of 40 by hand labor. Really, Brother Jonathan can now help the old man considerably.

PIN MANUFACTURE.—A writer, who has been looking into the statistics of pin manufacture, makes the statement that while 50 years ago it took one man a minute to make 14 pins, to-day, with our improved automatic machinery, a single workman can make more than 1,000 in the same time.

AMERICAN WATCHES.—The American Watch Co., of Waltham, Mass., has lately received an order from the British government for 372 watches, intended for the use of conductors, engineers, station masters and other employees of the state railroads of India. This is the third large order received by the company from the same source, and, like the former ones, was obtained in public competition with foreign manufacturers. The London *Jeweler and Metal-worker*, in its issue of January 15th, observes, in reference to this order: The contract for watches to be used by the officials of the Indian state railroads has again been secured by the American Watch Co. This is the third time Messrs. Robbins & Appleton have received this distinction, which is not a barren one, for it must be evident to the most prejudiced individual that the timekeepers supplied on the previous occasions must have given satisfaction, and answered the tests required of them. This is a mortifying fact for Englishmen, especially for those who believe that were manufacturers here to show more enterprise, they would be able to compete advantageously in the manufacture of all grades of watches.

STATISTICS OF THE IRON AND STEEL INDUSTRY. Mr. James M. Swank, Secretary of the American Iron and Steel Association, has nearly ready for distribution, to members of the association, a directory of the iron and steel industry of the U. S. This compilation will give the name and location of every blast furnace, rolling mill, steel works, forge and bloomery in the country, with full information concerning each, especially with relation to the character and capacity of the same. From this valuable source of information we glean the following leading statistics: Number of completed blast furnaces, March 1, 1880, 697; number in process of construction, 44; annual capacity of completed furnaces, 13,000,000 tons. Number of completed rolling mills and steel works, 382; number now in process of construction, 10; number of puddling furnaces, 4,467; number of heating furnaces, 2,419; number of trains of rolls, 1,397; annual capacity of rolling mills for finished iron, 400,000 tons; annual capacity of rail mills for heavy rails, 2,150,000 tons; number of nail machines, 4,152; number of Bessemer steel works, 11.

RAILROAD SCALES FOR SOUTH AMERICA.—The bark *Amy A. Lane*, was recently loaded with American goods at New York, for Rio de Janeiro. An important part of her cargo is a lot of 40 large railroad scales, built by the Howe Scale Company for the Dom Pedro railroad, of Brazil. This line is one of the most important in Brazil, running from Rio into the heart of the agricultural region, and enjoys the special patronage and care of the Emperor, in whose honor it is named. The selection of the Howe scales for use on this road is a compliment to American mechanics, which should be appreciated, and shows a preference for them in that country over all others.

AMERICAN VS. ENGLISH MECHANICS.—An English manufacturer traveling in America for the purpose of inspecting various industrial establishments, recently wrote: "I spent some hours recently at the Cleveland rolling mills. They have a wire mill attached for drawing nothing but Bessemer steel wire, of which they turn out 75 tons per day, and have one room with 1,000 small hocks, each man tending 32 hocks, whereas in England we consider a man that runs eight blocks of steel is a wonder. So much for your country. I saw it with my own eyes, and was never more astonished."

THE COTTON-SPINNING INDUSTRY OF THE WORLD.—This industry, of the entire world, consists of 71,250,000 spindles, of which more than half (or 39,500,000) are operated by British manufacturers. The U. S. has 10,050,000; France has 5,000,000; Germany, 4,800,000; Russia, 2,860,000; Switzerland, 1,870,000; Austria, 1,800,000; Spain, 1,775,000; Italy, 900,000; Belgium, 800,000; India, 1,275,000; Sweden and Norway, 310,000; Holland, 230,000; and other countries, 80,000 spindles.

THE INDIA RUBBER BUSINESS.—There are in the U. S. and Europe more than 150 manufacturing of India rubber goods. These employ from 10,000 to 15,000 operatives, and consume annually about 40,000,000 lbs. raw material. The bulk of the crude rubber, and the best quality, is brought from Brazil, though considerable quantities are obtained from Central America, Africa (especially Madagascar), India and the islands of Borneo and Sumatra.

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AMERICAN WINDMILLS IN ENGLAND.—Windmills of American manufacture continue to be exported in considerable numbers, particularly to the British colonies. One of the largest lately shipped had a diameter of 24 ft., and single castings in it weighed 5,000 lbs.

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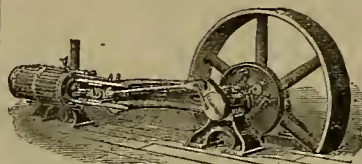
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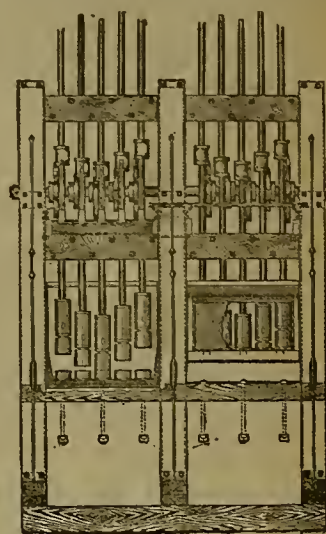
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THE INDUSTRIAL WORLD.

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So vast has become the grain trade of New York that it is the belief at the Produce Exchange that the great bulk of the shipping trade of the west will center there. They count upon six additional steamers, at least, a week, leaving that port within the next year, entirely devoted to the grain, cattle, and meat traffic between this country and Europe. To meet the demands of the grain trade, enormous elevators have been built with such facilities that as many as 40 and 50 cars can be unloaded at one time. The following facts concerning them will give some idea of the business done: The elevator built by the Erie Railroad Co., and only completed very recently, has a capacity for 1,500,000 bushels of grain, and is able to unload a car in the extremely short time of three minutes. It is situated on the New Jersey side of the North river, only a short distance from Pavonia ferry. It is claimed by the company to be the largest and most complete in construction in the country. The dock on which it stands is 1,750 ft. long, 100 ft. wide, the elevator itself being 375 ft. long, 80 ft. wide, 165 ft. high, with a stock of 180 ft. The machinery is run by two 250-horse power engines, and the elevator can receive and unload 40 cars at one time by means of steam shovels, at the rate of three minutes, and can load four ordinary steamers in four hours. The cost of the structure was \$750,000.

The immense elevator rests upon a foundation of granite pillars 16 ft. high and 8 ft. square. The large elevator built by the Pennsylvania Railroad Co., is located at Harrison's Cove, Jersey City, and is so constructed that it will hold more grain than that of the Erie. Bulk will have to be broken only once from Chicago or St. Louis to its final destination.

Those built by the New York Central and Hudson River road, as before stated, are at 61st and 63d streets, North river. Both are capacious. The second can unload and receive a cargo at the same time. 400 cars can be unloaded in a day and 500,000 bushels shipped into vessels. Two of the largest ocean steamers can easily lie alongside the dock of the second elevator and be loaded or unloaded at the same time. The building is 355 ft. in length, 70 ft. in breadth, and 131 ft. to the ridge of the roof, with a dock on both sides and on the river front. It is built of timber laid and spiked in what is known as the crib form, and over 3,000,000 ft. of timber was employed in its construction. It has no less than 20 shipping bins, each holding 1,000 bushels of grain, and can be cleared at the rate of 7,000 bushels an hour. The cost is close upon \$500,000.

THE PULLMAN PALACE CAR CO.—One of the largest manufacturing establishments in the country is now being built by the Pullman Car Co., at a cost of \$1,000,000. It is located near Chicago, on the Illinois Central railroad, three-fourths of a mile south of the Kensington station. About 150 acres is included in the site, and will be laid out in drives and lawns, with two attractive parks. On one side is water transportation by Lake Calumet, and on the other the Illinois Central railroad tracks, while but a short distance away is the junction of the innumerable roads leading into Chicago. The structures will be of brick and stone, having 1,130 ft. of frontage and facing the double track of the Illinois Central railroad. They will consist, first, of two parallel buildings for erecting shops 690 ft. long and 87 ft. wide. The central section, containing the offices and store-rooms, will be 100½ ft. long and 100 ft. deep, three stories high, with a tower rising to a height of 146 ft. In the rear of these will be a series of four buildings, covering an aggregate frontage of 1,047 ft., with a general depth of 200 ft., forming the wood machine shops, blacksmith shops, variab-room, repair shops and two erecting shops. Still back of these will be another erecting shop, 474x86 ft., a dry kiln 150x80, and a foundry 130 ft. front and 200 ft. deep. These buildings are compactly located as regards each other, making them convenient of access. The erecting shops will have stalls for 50 passenger cars and 100 freight cars at one time. Tracks running between the various shops will be provided with numerous turn-tables, so that cars can be run in and out without switches.

The Edison telephone connects the British Parliament buildings directly with the London newspaper offices, so that the debates can be reported and put in type an hour earlier in the morning than heretofore. It was but lately that the London Times was printed on a Yankee press; now it is a Yankee that helps on the chiu music in Parliament, and we half suspect that they have a Yankee type printing machine connected with it, one that is claimed to set up 100 lines an hour, instead of 40 by hand labor. Really, Brother Jonathan can now help the old man considerably.

PIN MANUFACTURE.—A writer, who has been looking into the statistics of pin manufacture, makes the statement that while 50 years ago it took one man a minute to make 14 pins, to-day, with our improved automatic machinery, a single workman can make more than 1,000 in the same time.

AMERICAN WATCHES.—The American Watch Co., of Waltham, Mass., has lately received an order from the British government for 372 watches, intended for the use of conductors, engineers, station masters and other employees of the state railroads of India. This is the third large order received by the company from the same source, and, like the former ones, was obtained in public competition with foreign manufacturers. The London *Jeweler and Metal-worker*, in its issue of January 15th, observes, in reference to this order: The contract for watches to be used by the officials of the Indian state railways has again been secured by the American Watch Co. This is the third time Messrs. Robbins & Appleton have received this distinction, which is not a barren one, for it must be evident to the most prejudiced individual that the timekeepers supplied on the previous occasions must have given satisfaction, and answered the tests required of them. This is a mortifying fact for Englishmen, especially for those who believe that were manufacturers here to show more enterprise, they would be able to compete advantageously in the manufacture of all grades of watches.

STATISTICS OF THE IRON AND STEEL INDUSTRY. Mr. James M. Swank, Secretary of the American Iron and Steel Association, has nearly ready for distribution, to members of the association, a directory of the iron and steel industry of the U. S. This compilation will give the name and location of every blast furnace, rolling mill, steel works, forge and bloomery in the country, with full information concerning each, especially with relation to the character and capacity of the same. From this valuable source of information we glean the following leading statistics: Number of completed blast furnaces, March 1, 1880, 697; number in process of construction, 44; annual capacity of completed furnaces, 13,000,000 tons. Number of completed rolling mills and steel works, 352; number now in process of construction, 10; number of puddling furnaces, 4,467; number of heating furnaces, 2,419; number of trains of rolls, 1,397; annual capacity of rolling mills for finished iron, 400,000 tons; annual capacity of rail mills for heavy rails, 2,150,000 tons; number of nail machines, 4,152; number of Bessemer steel works, 11.

RAILROAD SCALES FOR SOUTH AMERICA.—The bark *Amy A. Lane*, was recently loaded with American goods at New York, for Rio de Janeiro. An important part of her cargo is a lot of 40 large railroad scales, built by the Howe Scale Company for the Dum Pedro railroad, of Brazil. This line is one of the most important in Brazil, running from Rio into the heart of the agricultural region, and enjoys the special patronage and care of the Emperor, in whose honor it is named. The selection of the Howe scales for use on this road is a compliment to American mechanics, which should be appreciated, and shows a preference for them in that country over all others.

AMERICAN VS. ENGLISH MECHANICS.—An English manufacturer traveling in America for the purpose of inspecting various industrial establishments, recently wrote: "I spent some hours recently at the Cleveland rolling mills. They have a wire mill attached for drawing nothing but Bessemer steel wire, of which they turn out 75 tons per day, and have one room with 1,000 small blocks, each man tending 32 blocks, whereas in England we consider a man that runs eight blocks of steel is a wonder. So much for your country. I saw it with my own eyes, and was never more astonished."

THE COTTON-SPINNING INDUSTRY OF THE WORLD.—This industry, of the entire world, consists of 71,250,000 spindles, of which more than half (or 39,500,000) are operated by British manufacturers. The U. S. has 10,050,000; France has 5,000,000; Germany, 4,800,000; Russia, 2,860,000; Switzerland, 1,870,000; Austria, 1,800,000; Spain, 1,775,000; Italy, 900,000; Belgium, 800,000; India, 1,275,000; Sweden and Norway, 310,000; Holland, 230,000; and other countries, 80,000 spindles.

THE INDIA RUBBER BUSINESS.—There are in the U. S. and Europe more than 150 manufacturing of India rubber goods. These employ from 10,000 to 15,000 operatives, and consume annually about 40,000,000 lbs. raw material. The bulk of the crude rubber, and the best quality, is brought from Brazil, though considerable quantities are obtained from Central America, Africa (especially Madagascar), India and the islands of Borneo and Sumatra.

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AMERICAN WINDMILLS IN ENGLAND.—Windmills of American manufacture continue to be exported in considerable numbers, particularly to the British colonies. One of the largest lately shipped had a diameter of 24 ft., and single casing in it weighed 5,000 lbs.

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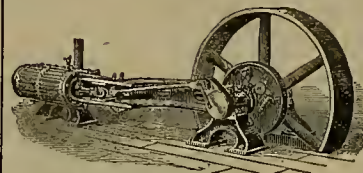
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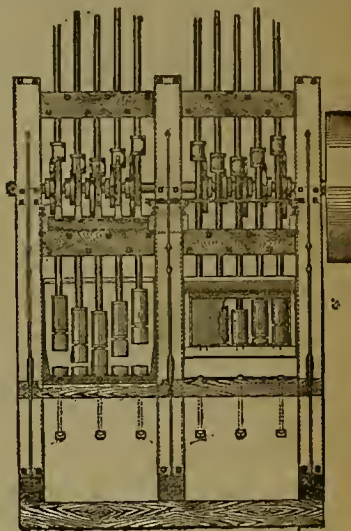
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING AUGUST 10TH, 1880.

231,097.—AIR COMPRESSOR.—R. M. Catlin, Tuscarora, Nev.
230,865.—CEMENT.—A. Y. Easterly, Napa, Cal.
231,101.—POTATO DIGGER.—J. L. Rodnick, Petaluma, Cal.
231,103.—INDICATOR.—J. Rothencuber, Virginia, Nev.
231,126.—MIRROR HOLDER.—Webb & Myrick, Stockton, Cal.
231,133.—STATION INDICATOR.—R. Matthei and C. A. Clinton, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS. Roberts et al. vs. Schreiber.

U. S. Circuit Court, Western District of Pennsylvania. Decided June 10, 1880; Strong, J.

1. Reissued Letters Patents No. 6,253, granted to E. A. L. Roberts, January 6, 1875, the claim in which is for "the method or process of increasing or restoring the productiveness in oil-wells, by causing an explosion of gunpowder or its equivalent at or near the oil-bearing point, in connection with superincumbent fluid tamping, substantially as described," declared to be for the same invention as his original patent dated May 20, 1866, and sustained.

2. The decision in the case of Roberts vs. Dickey & Fisher, 632, construing the true meaning and scope of such original patent, approved.

3. The application of a blast in a bore-hole sunk in an ordinary well is not an anticipation of a process by which a torpedo may be exploded many hundred feet below the surface of the ground and below the top of the rock through which an artesian well has been sunk, and at the exact point in the well where the effect of such explosion is desired, with a water tamping sufficient to confine the effect to the vicinity of its location.

4. Unsuccessful and abandoned experiments cannot avail to invalidate a patent to an inventor who has disclosed to the public an invention the utility of which has been demonstrated by its general adoption.

5. The cause that works successful results cannot be the same as that exhibited in abandoned experiments, and holding the latter up as anticipation of the former, is but an illustration of what is very common—an attempt to defeat a meritorious invention by proof that something similar had been previously known, though it had never been perfected and had never been any useful combination to human knowledge or convenience.

6. The process invented by Roberts, as disclosed by his specification, does not require that the superincumbent fluid tamping should fill the well, but that there should be a sufficient column of fluid to confine the effect of the blast.

7. Letters Patent No. 47,453 granted to E. A. L. Roberts, April 25, 1865, for improvements in apparatus for exploding gun powder or the explosive material in artesian or other similar wells, construed and sustained.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

"THE CALIFORNIAN" FOR SEPTEMBER.—This sprightly home monthly, which is welcomed by an increasing list of appreciative readers, offers a dainty table of contents for September. We have had only time for a casual reading, but the flavor of several articles was distinctly pleasant. The spirit of Mr. Clement's opening article on the political maxim, "To the Victors Belong the Spoils," leads in the right direction and will command attention. Mr. Sam. Williams follows with a readable account of the Algerian patriot, Abd-el-Kader. There is a good sketch of John A. Sutter, by Alexander Del Mar; and the vineyards and wines of Napa valley glow and sparkle under the deft hand of Sallie R. Heath. A very interesting paper is Hon. Henry A. Pierce's account of the early discoveries of the Sandwich Islands. New England people especially will be delighted with Prof. Martin Kellogg's charming sketch of a "New England Farm." A serial, entitled "A Strange Confession," promises to be an interesting story. D. S. Richardson, for several years attached to our legation in Mexico, relates his experience in a very agreeable way. In addition to these principal articles, there are many minor ones and some bits of excellent poetry, the whole combining to form perhaps the best number of the magazine yet published. The Californian is the peer of the first magazines in the country, and to maintain its excellence the publishers have discovered that they must raise its price up to the Eastern rate for similar monthlies. Accordingly, they announce that after October 1, 1880, the yearly subscription will be advanced to \$4, and single copies to 35 cents. It is published at 202 Sansome street.

SHOCKING THE PHYLLOXERA.—We hear in a very round-about way that a French chemist thinks he is warranted in asserting that the phylloxera can be destroyed by electricity. He sends a current by means of the Ruhmkorff coil directly to the roots of the vines, killing, as he says, not only the insect, but its eggs. When the steam is turned on the Ruhmkorff the insects are at once seized with a desire to shuffle off their mortal coil—so to speak.

At Odessa, three weeks ago, were married two mites of creatures, the man being 30 years old and weighing 19 pounds, and the woman 22 and 13 pounds in weight.

Address of Hon. A. A. Sargent.

CONTINUED FROM PAGE 118.

in theory and practice, its highest stations to the attainment of the humbleness; a land where free men, free thought and free labor gave witness to the beneficence of the maxim that all men are created equal; that distinctions of birth are pernicious, and only distinctions of merit are worthy of recognition; gave its crowning stamp to industry, and acknowledged it as the condition of progress and prosperity. It was a grand spectacle when America greeted the nations assembled on its soil and distributed eagerly-sought honors to artistic and mechanic excellences.

Former Oppressions and Contempt for Labor.

This recognition of the dignity and value of labor is entirely modern. Not many ages ago the artisan was a serf, or, if nominally free, the prey of great and petty tyrants. It is a long etride in England from the condition of Gurth, born thrall of Cedric the Saxon, to the modern barbor ennobled by the king for his inventions. There is as great a step between the expulsion of the Huguenot artisans from France and the giving, by republic and empire alike, of medallions and ribbons to such workers, and glorifying them as the strength of nations. The extent and importance of the successive immigrations to England, caused by the blind cruelty of the ruling powers of the continent, are well set out in Lecky's recent admirable history of England in the eighteenth century. When the news of the intended entry of the Duke of Alva into the Netherlands was known, more than 100,000 persons in a few days abandoned their country. Great numbers of them took refuge in England, and they were followed in 1572 by a crowd of French Huguenots, who had escaped from St. Bartholemew, and in 1585, on the occasion of the sacking of Antwerp, by about the third part of the merchants and workmen of that city. A century later the revocation of the edict of Nantes produced a new immigration of French protestants variously estimated at from 50,000 to 100,000. Several thousand Germans, chiefly from the Palatinate, went over in 1709; many others in 1732, after the persecutions in Salzburg; and toward the middle of the century a renewal of persecution in France was followed by a fresh French immigration. In this manner the commercial classes in England were at length thoroughly pervaded by a foreign element. Spitalfields was almost wholly inhabited by French silk manufacturers. A colony of French protestants settled in Edinburgh, where they introduced the manufacture of cambric. Forms of industry before entirely unknown in England were introduced there. Cloth makers from Antwerp and Bruges, lace makers from Valenciennes, cambric makers from Cambrai, glass makers from Paris, stuff weavers from Meaux, potters from Delft, shipwrights from Havre and Dieppe, silk manufacturers from Lyons and Tours, paper makers from Bordeaux and Auvergne, woolen manufacturers from Sedan and tanners from Touraine, were all plying their industries in England. The manufacturers of silk, damask, velvet, cambric and baize, of the finer kinds of cloth and paper, of pendulum clocks, mathematical instruments, felt hats, toys, crystal and plate glass, all owe their origin in England wholly or chiefly to Protestant refugees, who also laid the foundation of scientific gardening, introduced numerous flowers and vegetables that had before been unknown, and improved almost every industry that was indigenous to the soil. What England thus so largely gained was lost by France and the Netherlands. In the former country the arts were nearly stamped out, and the primal causes of the revolution were set in motion. It is true that these artisans were not expelled from France because they were such, but notwithstanding that fact, they were coldly received in England, and occasionally mobbed, from the insular prejudice of the population. The age was not wise enough to appreciate the value of the worker.

The Craftsman in Literature.

What were called the free cities in Europe, which were nuclei of arts and trade, maintained their scanty privileges, bought with money of necessitous nobles, only by constant repurchase or by dint of arms. The tradesman was looked down upon as a grovelling being, the alternate sport and prey of the powerful. Shakespeare reflects the sentiment of his age when he makes a fool of Bottom the Weaver, a brutal ruffian of Jack Cade and fills Casca's mouth with bitter sarcasm on the common people. The plays of the restoration are full of unsavory jests at the expense of craftsmen. Even Hume designated the whole class of workers as "the industrious vulgar." When enlightened minds thus branded labor as ignoble its esteem in general society was indeed low. Early English Parliaments assumed to fix its wages at a miserable pittance, and to regulate the prices of its products. The transition from such a state of things to the entire emancipation of industry, the enactment of patent laws in reward of invention and the conferring of social distinctions upon eminent inventors, is so great that it needs a glance backward to appreciate the distance traversed.

The Toiler in the U. S.

In this land the laborer and artisan have least reason to be discontented with their lot. While the fluctuations of business may affect them, as they do all other classes, the laws and customs of society are such as to give to them every pro-

tection, facility and deserved honor and reward. He is certainly not a friend to the toiler who seeks to overthrow the institutions here enjoyed, or destroy the conditions which secure to the possessor sither inherited or earned wealth. I know such projects are not the product of American soil, and are not in harmony with our traditions. They interfere with the rights of laborers, they threaten the public peace, and tend to inaugurate a reign of mob violence and misrule. Unless checked, such ideas may lead to serious misfortunes, and to none greater than to the class whose name is profaned as the agent and proposed beneficiary.

The Doctrine of Agrarianism.

The doctrine that property is robbery is false, and its practical enforcement would paralyze enterprise and destroy every vestige of national and individual prosperity. It would alike deprive the artisan of the product of his labor and the capitalist of the proceeds of his investment. Barbarism would be invited to reign where civilization now rules. Wealth and honors are an ever-alluring reward held out to successful workers. Deprived of such incentives, society would become stagnant. Agrarianism may find an account in substituting for the daily earnings of the world a distribution of past accumulations; but these would soon be devoured, and the impoverished multitude resume its labor or perish. Meantime the hand on the dial of progress would have been put back a dozen generations. That state of society is best which respects equally the interests of those who have and of those who would acquire, which holds in just equilibrium the rights of capital and labor.

Cheap Labor Means Squalid Living.

I am far from believing that the beet has yet been said and done to reconcile the interests of these two great elements. It is possible that the future may develop a co-operative system by which the wages of the laborer shall be an assured part of the profits of capital, in those enterprises of capital where profit is the object. As at present developed, the objection seems to be that labor cannot wait for good seasons, while capital can, and may starve in those times of depression when no profits are made. However this may be, and however the enlightenment and humanity of the future may solve the great problems of social and industrial life, one thing is clear to my mind—that is, that it is not to the interest of society to cheapen labor. Cheap labor means squalid living, limited education, degradation and want. The laborer is worthy of such hire as shall enable him to maintain the self-respect and decency of an American citizen. Any circumstance depriving him of this, whether the presence of slavery, the influx of Mongolians, or foreign competition in home markets, should awaken the solicitude of statesmen and lead to remedial measures commensurate with the evil.

Mechanics' Fairs and the Progress of the State.

And now, in conclusion, I congratulate you upon the successful inauguration of the Fifteenth Industrial Exhibition of the Mechanics' Institute of San Francisco. It marks and promotes the progress of the State. It performs in its sphere the work done by great International exhibitions in theirs. It tends to stimulate enterprise, industry and invention, by exciting wholesome emulation among its many exhibitors. There are great possibilities of good in your enterprise, in lasting benefit to all the interests of the coast. A glance at the multifarious articles exhibited, impresses the idea that many of them are better than those which the world generally has in use. Hence our productions are making their way abroad. American reaping machines were recently engaged in a competitive trial at Bucharest, and so delighted the Roumanian farmers that large orders followed. It was once contemptuously asked, "Who reads an American book?" Irving, and Motley, and Prescott, and Longfellow and Whittier, and many others answered the question. It has more recently been asked, "Who drinks an American wine?" California answers by shipping cargoes of wine to Europe. There is a broad field for American products and American enterprise, ready for industry and tact to enter. As these exhibitions encourage excellence of production, they fit our products to compete advantageously with others in the markets of the world, and lead up to the day when California will realize the advantages of its geographical position, in the possession of a commerce that will embrace Asia and the isles of the Pacific seas.

TORN BY HYENAS.—The telegraph brings the news of a terrible occurrence at Winchester, Va., on Tuesday the 17th. inst. It appears that while Coup's circus and menagerie troupe was parading the streets the keeper of a cage of hyenas was seized and torn almost in pieces by the ferocious animals. The keeper, whose name was Drayton, made a most heroic effort to save his life, and, in the face of the tremendous peril of his position, assumed his usual cool tone of command, but the infuriated beasts did not heed him. The people who witnessed the man's brave struggles for his life were powerless to help him, as they did not dare to open the cage. After desperate efforts some of the showmen succeeded in rescuing the hapless keeper, but he was so frightfully wounded as to leave small hope of recovery.

The population of Oregon will foot up about 170,000. It was 90,000 ten years ago. The increase is about 90%. This is a remarkable gain.

Leaf-Variation in Acacia Trees.

[CONTINUED FROM PAGE 121.]

to produce foliage enough to hide them.

But in our hard battle we lost forever our original leaves, and we are only permitted to bear them in infancy. In the second year we have to cast them away, and it seems almost like a dream that we ever had them, so that we scarcely realize it. Our many relations (some 220) have already forgotten that they once lived in the loveliest country on earth, and they do not know what those few leaves they bring forth in childhood mean; and you, wise men, if it were not for us, you would be as ignorant as they are. The land that saw our struggles and hardships, where we found refuge, is becoming the home of another race. Assisted by man they gain a foothold, until their deadly shade deprives us of the life-giving sun. We must have bright, strong sunlight. In bright California we have still found another home. In the rocky hills and barren sand we prepare the place for others, until in due time here also we shall be driven out.

From Lake County.

EDITORS PRESS:—Lake county as a sanitarium, on a large scale is destined to prove a great success. Nowhere can you find more picturesque scenery, brighter skies or purer air, while medicinal springs of every degree of temperature, and every conceivable mineral compound, are pouring their healing waters, inviting the sick and decrepit of all classes to come and be cured of their maladies. The immense number and variety of the springs and the great merit of many of them is truly wonderful. We spent a few very pleasant days at Seigler springs, a few miles from Lower Lake, which are once more opened for the accommodation of visitors, under the management of W. T. Garratt, Esq. Few springs stood higher in popular favor than these till they were closed from the public. Many old visitors will be glad to know that the public are once more invited to come and partake of their healing waters; and under the popular management of Mr. Garratt and his accomplished lady the place should become once more a favorite resort for all deserving classes. Some of the hot and steaming springs here are but little less wonderful than the most noted geysers.

About a mile and a half from Seigler springs it was our good fortune to meet our old and esteemed friend, H. W. Rice, in his pleasant home, nestled amid surrounding hills and natural groves, at the foot of Mt. Hannah, from which it is separated by a beautiful sheet of water. Twenty-eight years ago, at the close of a five months' voyage around Cape Horn, we parted from him in San Francisco, each eager in the pursuit of fortune—determined to make his mark, if possible, in the State of his adoption, each in his own way. I find our friend Rice has done or is in a fair way to do both. And right nobly has he earned the prosperity that awaits him. You doubtless remember him as the inventor of the "straw-burning engine," which he has brought into extensive use by his persevering energy.

His saw and planing mill here is very complete, showing everywhere the evidences of his inventive genius, and is capable of turning out a large amount of lumber of almost every variety for house building, mining, fencing, etc. He showed us fine oak lumber for organs that he was getting out for an organ builder at Kelseyville. We were shown specimens of oak door-panels got out at this mill that were perfect gems. Though the mill has been in operation 15 years, he has made but little impression upon the groves of timber surrounding him. But in his ceaseless war upon these giants of the forest, friend Rice has not forgotten the amenities of life or the gentler, kinder duties due to home and the home circle, so often neglected or utterly ignored by our California fathers and husbands in their eager pursuit of gold. I hardly know which to admire most—the energy and indomitable will that has thus compelled fortune to smile upon his labors, or the marked and constant effort of himself and noble wife to make home beautiful and attractive to their children, as well as to themselves—not, as is too often the case, a mere place to eat and sleep, but a real home, a rest for the heart as well as the body—a place of loving words and smiles, a joyous remembrance forever. Would that we had more such. Loving, Christian homes in which to educate our children would do more for the real prosperity of California than years of legislation. Mr. Rice has fitted up one room in his dwelling for a pleasant school-room, where his children are daily instructed by a competent teacher, and ever Sunday evening Mrs. Rice receives the children of their employees in their sitting-room for instruction in Sunday-school lessons. The two happy evenings my friend and I spent in that cheerful sitting-room, with its bright, blazing wood fire, surrounded by that pleasant family circle, will not soon be forgotten.

Soda Bay, July 14, 1880. S.

MEMPHIS, Tenn., has lost 8,000 in population in ten years, and is the only city in the Union that has decreased, although some cities have remained almost stationary.

News in Brief.

Fifty ladies are struggling for medical honors in Paris.

The Santa Clara Agricultural fair begins October 4th.

There are nine tenant-farmers in the British Parliament.

The census shows not a woman in Greenland, Vt., over 30.

Adelaide Neilson, the actress, died suddenly in Paris, Aug. 15th.

The demand at the Treasury for standard silver dollars is steadily increasing.

John Lume, of Astoria, killed a 900-pound elk recently on Saddle mountain.

Sir Stratford Canning, for many years British Ambassador to Turkey, is dead.

The cultivation of casava and arrowroot is being generally embarked in by Honda farmers.

Major-General Grimes of the Confederate army has been assassinated in North Carolina.

The New Orleans schools have been closed until there shall be money enough on hand to pay expenses.

Lockjaw runs in a family in Camden, N. J., three members of which have recently died from that cause.

In Illinois a duel was recently fought with coffee and blank cartridges, and they shook hands and parted.

The Tokio (Japan) Times says that a shock of earthquake is probably felt in some part of the island every day.

Heavy fires are raging in the timber in various portions of Oregon. No serious damage is reported as yet.

At the signal station at the top of Mt. Washington, the other day, the mercury marked 31 degrees and water froze.

Some ladies at Saratoga wear red jackets of breakfast, and look like members of the old volunteer fire department.

The New Haven police recently broke up a street fight by throwing water on the combatants with a fire engine.

Tuesday, Aug. 9th, 2,000 acres of pasture on Dry creek, Alameda county, were burned over. Cause, careless hunters.

The far trade on the northeast coast has been very good this year, the catch of fur-seal and bear being unusually large.

Work on the Normal School building at San Jose is progressing rapidly. The force of men has been increased to eighty.

Warehouses are crowded with wheat at Merced. Unless the farmers begin to sell, there will not be storage room.

Rochester is to have a colossal tower surmounted by an enormous statue of Mercury. It will advertise a tobacco factory.

Plates and jewelry to the value of £20,000 have been stolen from the residence of Lord Eldon, near Warthorn, England.

Threats are made that the Land League will prevent the collection of rents in Ireland against all the power of England.

H. E. Barton of Lake valley, El Dorado county, has lost 800 acres of pasture and two miles of fence from fires this year.

A colored preacher in Georgia makes his parishioners work out his salary on his farm when they have not money to pay it.

There is a funny report that it is fashionable in Paris just now for brunettes and medium blondes to dye their hair a blue black.

A boy was given three months of hard labor in the workhouse in Cambridge, England, for plucking a rose and a sprig of geranium.

Senator Bruce, of Mississippi, is reported to be the possessor of two large plantations in his State, and has a fortune also of \$200,000.

Two boys in Paris settled a dispute by having a duel with knives, which they threw at each other. One was killed, and the other arrested.

The President of the Imperial Bank of Germany has, in a remarkable treatise, exposed the mistake made in abolishing the silver standard.

A serious riot took place in Glasgow on Saturday, Aug. 14, between Home Rulers and Orangemen. Two policemen were fatally injured.

White satin sun-shades elaborately painted by hand are carried by some of the fashionable women who ride in open carriages along Bellevue avenue at Newport.

A man, who was one of the five in a wagon which was struck by a locomotive in Syracuse, says that the engineer was flirting with a young lady at the time.

Erskine Wood, shot by Hiram C. Briggs at Coeymans the other day, ran half a mile and lived fifty-eight hours after the bullet had passed through his heart.

The man who fired at Lord Lytton, Viceroy of India, in December, and then declared himself to be insane, has recovered and has been committed for trial.

An English rector has omitted the prayers for Parliament since the Liberals came into power, and says that "he does not think such a lot worth praying for."

Lindsay Munn has been messenger at the office of the Secretary of the Navy for more than half a century, having been appointed under John Quincy Adams, July 15th, 1828.

They are showing inventions in England in devising pretty additions to weddings. Four little children dressed as sailors holding the bride's train in the bridal procession was one of the features of an English wedding last month.

There is a man in England who is a willing defendant in a suit for divorce by his wife, co-respondent in another man's suit for divorce, and engaged to marry a lady who is at present the wife of a nobleman.

GOLD AND SILVER MINES IN NEW YORK.

Prospecting for occurrences of gold and silver in the State of New York would appear to have reached the stage of fever heat. Over 100 claims of gold and silver discoveries have been filed in the office of the Secretary of State within the past year, and since the first of last June three or four claims have been filed in a day. Nearly all of the alleged discoveries have been made in the region that is embraced in Hamilton, Saratoga and Fulton counties, which form the southern edge of the great Adirondack wilderness. Almost all the discoveries are said to be gold and silver, while a few specify gold or silver alone. According to the New York Sun, the following are said to be the ascertained facts: That gold and silver really exist; that no one really knows whether they exist in paying quantities or not; that two mines are being worked; that attempts have been made to sell one claim; that almost everybody in that region has got the gold fever; that there is more or less expert prospecting going on; that there is a possibility that there is a very rich mining country in the region described; that the probability is it will cost more than it will come to to mine gold and silver in northern New York.

MINING WORKS DESTROYED.—The works of the Copper Mining Co., at Sponceville, Nevada county, of which we gave a brief account last week, were destroyed in a singular way on the 11th inst. The Nevada Transcript gives this statement of the occurrence: The vein of copper ore in the mine is very wide, and the owners have been hearing it out its whole width and to a great height, with only here and there a long timber to support the roof. On Wednesday the immense weight of ground, and the hoisting works which were built over the mine, caused the supports to give way, and the building and machinery, together with two men, the engineer, named Hughes, and another man, sank down a distance of 25 ft. Directly afterwards the hoisting works took fire, and in five minutes they were a mass of flames. The men fortunately escaped through the air shaft. Mr. Hughes sustained a dislocation of the shoulder. It was a fortunate escape from a horrible death.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

Quinine and Arsenic

Form the basis of many of the Ague Remedies in the market, and are the fast resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. Ayer's Ague Cure is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent and certain, and no injury can result from its use. Besides being a positive cure for Fever and ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive, as well as cure, of all complaints peculiar to malarious, marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

FOR SALE BY ALL DEALERS

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

FRESH attractions are constantly added to Woodward's Gardens, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS Patent Agency Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So he sure and send us notice by letter.

J. G. COLMERT is requested to report to this office from Humboldt Co.

EXTRA COPIES can usually be had of each issue of this paper, if ordered early. Price, 10 cents, postpaid.

Chew Jackson's Best Sweet Navy Tobacco.

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., August 13, 1880.

CANDLES.		OILS.	
Crystal Wax.....	17 @ 17	Pacific Glue Co's	
Rag.....	12 @	Neatfoot, No. 1.....	00 @ 90
Patent Sperm.....	25 @ 30	Castor, No. 1.....	01 @
CANNED GOODS.		do, No. 2.....	95 @
Assorted Pic Fruits.....		Baker's A. A.....	25 @ 30
2 1/2 lb cans.....	25 @	Oliver, Picadilly.....	5 @ 75
Table de.....	3 @	Posselt.....	75 @ 25
Jams and Jellies.....	3 @	Palm, B.....	9 @
Pickles, h. gal.....	3 @	Linsed, Raw, hhl.....	90 @
Sardines, q. box.....	1 5/8 @ 90	Cocunut.....	60 @
H. Boxes.....	2 50 @ 75	China nut, c.....	70 @
Merry, Paul & Co.....		Sperm.....	1 @ 40
Preserved Beef.		Coast Whales.....	35 @ 45
2 lb. doz.....	3 75 @ 87 1/2	Polar.....	45 @
do Beef, 4 lb. doz.....	60 @	Lard.....	80 @ 90
Preserved Mutton.		Photolite.....	6 @
2 lb. doz.....	3 50 @ 52 1/2	Oleophine.....	6 @
Beef Tongue.....	6 00 @ 25	Devon's Britt.....	16 @ 17 1/2
Preserved Ham.		Nonpareil.....	6 @
2 lb. doz.....	6 00 @	Eureka.....	19 @ 20
Deviled Ham, 1 lb.....	4 00 @	Barrel kerosene.....	30 @
do.....	4 00 @	Downer Ker.....	30 @
do Ham, 4 lb. doz.....	3 00 @	Elaine.....	34 @
Boneless Pic Feet.		PAINTS.	
2 lb. doz.....	3 75 @	Pure White Lead.....	51 @ 10
3 lb. doz.....	2 75 @	Whiting.....	14 @
Sliced Fillets.		Chalk.....	11 @
2 lb. doz.....	3 75 @	Paris White.....	2 @
Head Cheese.		Ochre.....	3 @
3 lb. doz.....	3 75 @	Venetian Red.....	3 @
COAL-Jobbing.		Ayer's Mixed.....	
Australian, ton.....	6 50 @	Paint, gal.....	
Coos Bay.....	6 50 @	White & talc.....	2 00 @ 2 40
Bellingham Bay.....	5 50 @ 8 00	Green, Blue &	
Cumberland.....	12 00 @ 13 00	Ch Yellow.....	0 00 @ 3 50
Mt. Diablo.....	4 75 @ 5 75	Light Red.....	3 00 @ 3 50
Lehigh.....	1 50 @ 2 00	Metallic Roof.....	1 30 @ 1 50
Liverpool.....	6 00 @ 6 50	RICE.	
West Hartley.....	8 00 @	China, Mixed, lb.....	6 @
Scotch.....	8 00 @	Hawallah.....	7 @ 7 1/2
Scrancon.....	7 50 @	SALE.	
Vancouver Id.....	7 00 @ 8 00	Oal Bay, ton.....	14 00 @ 22 00
Wellington.....	7 00 @ 8 00	Common.....	5 50 @ 14 00
Charcoal, each.....	75 @	Carmen Id.....	14 00 @ 22 00
Coke, bush.....	60 @	Liverpool.....	15 00 @
COFFEE.		SOAP.	
Sandwich Id, lb.....	6 @	Castile, lb.....	8 @ 16
Costa Rica.....	15 @ 16	Common brands.....	4 @ 6
Guatemala.....	15 @ 16	Fancy brands.....	7 @ 8
Java.....	15 @ 16	SPICES.	
Manilla.....	15 @ 16	Gloves, lb.....	47 1/2 @ 50
Ground, in c.....	25 @	Nutmegs.....	97 1/2 @ 10
FISH.		Pepper Grain.....	14 @ 15
Sac'd Dry Cod.....	4 1/2 @ 4 1/2	Pimento.....	19 @ 20
do in cases.....	5 @ 5 1/2	Molasses, Cal.....	
Eastern Cod.....	7 1/2 @ 7 1/2	1 lb glass.....	@ 25
Salmon, hbl.....	7 00 @ 7 50	SUGAR, ETC.	
H. hbls.....	3 50 @ 4 00	Cal. Cube, lb.....	@ 11 1/2
1 lb cans.....	@ 1 30	Powdered.....	@ 12
Pk'd Cod, hbls.....	@	Fine crushed.....	@ 11 1/2
H. hbls.....	@	Granulated.....	@ 11
Mackerel, No. 1.....		Golden C.....	@ 10
H. Bbls.....	9 50 @ 10 00	Cal. Syrup, kgs.....	70 @
In Kils.....	1 65 @ 1 75	Hawaiian Molasses	25 @ 30
Ex. Mils.....	3 50 @ 4 00	TEA.	
Pk'd Herrings, lb.....	3 00 @ 3 50	Young Hyson.....	
Boston Smk'd Hg.....	65 @	Moyno, etc.....	40 @ 65
LIME, ETC.		Country pk'd Gun-	
Plaster, Golden.....		powder & Im-	
Gate Mills.....	3 00 @ 3 25	portals.....	35 @ 75
Land Plaster, 10 lb.....	12 50 @	Hyson.....	27 1/2 @ 32
Lime, Sta Cruz.....		Foco-Chow C.....	27 1/2 @ 32
Lime, hbl.....	1 25 @ 1 50	Japan, 1st quality.....	40 @ 42
Cement, Rosen.....		2d quality.....	25 @ 40
Gate.....	2 00 @ 2 25	LUMBER.	
Portland.....	4 00 @ 4 50	CARGO PRICES OF REDWOOD.	
NAILS.		RETAIL PRICE.	
Ass'd sizes, keg.....	@ 5 00	Rough, M.....	13 00 @

WEDNESDAY M., August 13, 1880.

CARGO PRICES OF REDWOOD.		RETAIL PRICE.	
Rough, M.....	14	Pickets, Rough.....	15 00 @
Surface.....	24 00	Poluted.....	16 00 @
Rustic.....	15 24 00	Fancy.....	22 50 @
do, No. 2.....	18 24 00	Sliding.....	22 50 @
Flooring.....	24 00	Surfaced & squared.....	25 00 @
do, No. 2.....	17 00	Flooring.....	25 00 @
Beaded Flooring.....	28 00	do, No. 2.....	17 00 @
Refuse.....	20 00	Rustic, No. 1.....	25 00 @
Half-inch Sliding.....	22 00	do, No. 2.....	18 00 @
Refuse.....	16 00	Battens, lineal ft.....	2 00 @
Half-inch Surfaced.....	24 00	Shingles M.....	2 00 @
Refuse.....	16 00	PUGET SOUND PINE	
Half-inch Battens.....	16 00	RETAIL PRICE.	
Pickets, Rough.....	11 00	Rough, M.....	13 00 @
Rough, Pointed.....	12 50	Fenoling.....	18 00 @
Fancy, Pointed.....	13 00	Laths.....	3 60 @
Shingles.....	@ 1 75		

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Consolidated Virginia Mining Company,

Nevada Block, Room 26, S. F., August 7, 1880.

At a meeting of the Board of Directors of the Consolidated Virginia Mining Co., held this day, a Dividend (No. 53) of Fifty (50) Cents per share, was declared, payable on Monday, August 16, 1880. Transfer books closed until the 17th inst.

A. W. HAVENS, Sec'y.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, Room 37, S. F., August 16, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a dividend No. (58), of Fifty cents per share was declared, payable on FRIDAY, the 20th day of August, 1880. Transfer books closed until the 21st instant.

W. W. TRAYLOR, Secretary.

Gover Mining and Milling Company.

Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

Notice is hereby given that at a meeting of the Directors held on the Eleventh day of August, 1880, an assessment (No. 43) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 402 Front street, room 8, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Thirtieth day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Eleventh day of October, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

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J. P. CHAPMAN.....Assistant Treasurer.

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ALL STYLES OF FANCY HEAD BOLTS.
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Boiler repairs promptly attended to and at very moderate rates.

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RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES,
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SUGAR MILLS AND SUGAR-MAKING
MACHINERY made after the most approved plans.
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WATER PIPE, of Boiler or Sheet Iron, of any size
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Several first premiums received
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SLOT PUNCHED SCREENS,
which are attracting much at-
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facture of Screens. Mill owners us-
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Orders solicited and promptly attended to.

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All ordinary mending, sewing on buttons, etc., free of
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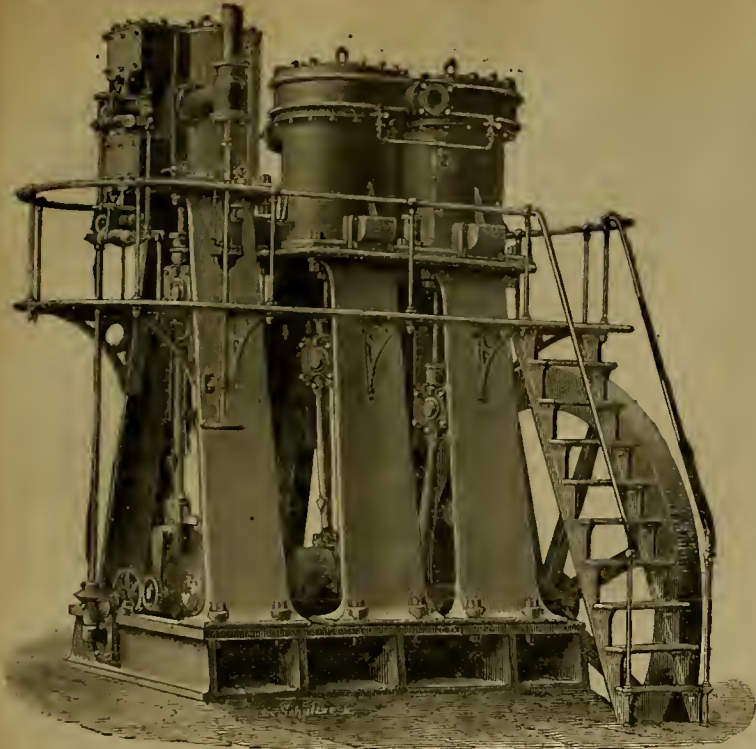
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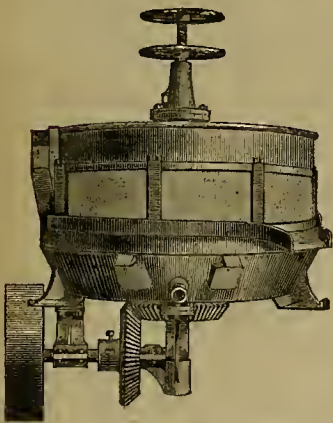
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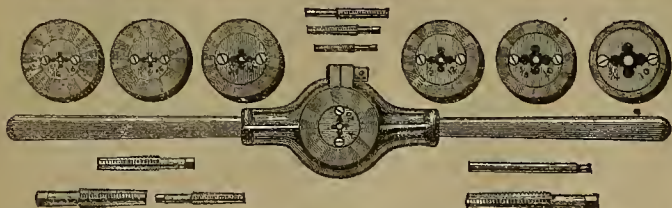
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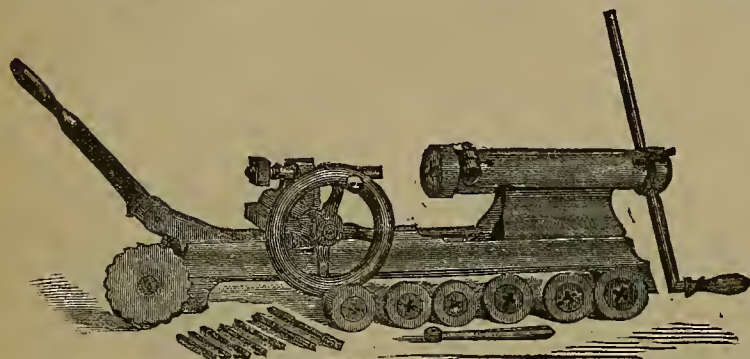
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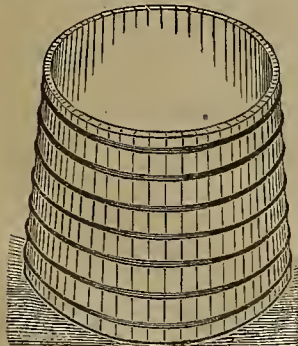
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 28, 1880.

VOLUME XLI
Number 9.

San Simeon Mining District.

This mining district is situated in San Luis Obispo county in this State, and has within its borders quite a number of promising quicksilver mines, and several coal mines, some of which will, when the promoters are able to work them properly, add considerably to the production of the State. It seems somewhat strange that the dormant wealth in this and other similar places should not have been more fully developed. There are many places where thousands of dollars would be realized from the ground in a short time, if sufficient capital were forthcoming to open the claims.

In conversation this week with Mr. David Lippman, of San Simeon, we learn that there are many quicksilver claims lying idle there, which will pay very well when quicksilver goes up again. The present low price of the metal prevents developments, and consequently many poor men have to sell out, while if they could keep their mines, they would realize from their work.

His instance to us the Polar Star mine, in San Simeon district. It has been worked to some extent, but not systematically. Some 500 tons of ore have been mined and 53 flasks of quicksilver produced, with very inferior appliances. A tunnel has been run 120 ft., and the ore body varies from 5 to 10 ft. wide, of 5% to 10% ore. There are two shafts on the mine. They have material enough in the mine to build a good furnace of 10 tons capacity, with plenty of wood and water for roasting and condensing. Mr. B. F. Chase has averaged a number of assays which shows the ore to have some 10% of mercury. This mine is idle at present, as are several more of similar character in the district. No doubt when quicksilver goes up again these mines will come to the front, but for the present their owners realize nothing from them.

San Simeon is on Geo. Hearst's ranch, and is the landing on San Simeon bay. The landing, warehouses, wharf, etc., belong to Mr. Hearst, his business there being under the intelligent management of Mr. E. C. Apperson. The place is so situated as to be the center of a fine dairy district, and the town is in a thriving condition. There is a whaling station at the point.

RICH QUARTZ STRUCK.—The recent strike of very rich gold-bearing quartz in the Rocky Bar mine, at Grass Valley, Nevada county, promises to be of great importance. The *Union* says that four candle boxes of rich specimens of the quartz were brought from the mine and exhibited in town, and that more of similar rock had been boxed in the mine. The extent of this rich nest is not known. The Ford & McDonald ground is on the same ledge as the Rocky Bar, and as the former produces rich rock all the time, it is probable that the considerable space of ground which lies between the workings of the companies will yield rock equally good. Another development has also been made in the Rocky Bar which is of the most encouraging character, and that is in finding a strong two-ft. vein at a few ft. from the bottom of the shaft, in the east drift. The ledge is heavy with sulphate, and is milling at the rate of \$30 per load. This is the heaviest vein yet found in the mine, and the most encouraging on account of its mineral characteristics. The ledge is entirely different in size and quality from that found above, and from its pitch promises to open out finely when the main incline is sunk deeper upon it. These promising finds in the mine are some 500 ft. apart, and, so far as is known, upon two distinct ledges, and they hold out the best encouragement the company has had since the mine has been opened. The Rocky Bar adjoins the New York Hill, which is now established as a reliable mine by the payment of frequent dividends.

In the last number of the *British Quarterly Review* the opening paper on "The Nations and the Commonwealth," speaks encouragingly of the growth among the rich of a spirit which robs class antagonism of its worst features, and what, it is predicted, will, before long, prove a solvent, under which the present trade organizations will become associative and cease to be combative.

The American Lubricator.

The lubricating of machinery by means of automatic devices, is of comparatively recent date. The old-fashioned oil cup, crude in its workings and wasteful in its distribution, was of doubtful expediency. The oil or tallow admitted directly to the cylinder or steam chest in large quantities, could not vaporize into steam, before it was thrown out of the exhaust pipe in a body, leaving behind little or no lubrication or benefit. Being applied but once an hour or even less frequently, the benefits were doubtful at the best, and when tallow, which was the favorite for cylinder lubrication, was used, the effects were often positively injurious, and it was no infrequent thing to find between the packing rings large balls of solid matter hammering against the springs, and eating the life and substances out of all the surrounding metal.

About four years ago the American Lubricator Co. commenced the manufacture of a device by which, through the counterpoise of condensed steam, oil could be admitted in the steam pipe at a point above the throttle, and in such limited quantities that each drop in its passage to the steam chest perfectly vaporized. Here then was a something which would penetrate as a vapor to every portion of the engine; the governor, the valves, the rings, the springs and the inner surface of the cylinder, and yet never in quantities which were not instantaneously ejected, before a cumulative effect could cause them to assume an injurious form. The supply, too, could be perfectly regulated from one drop a minute to one a second, and yet no admission of oil could take place until the opening of the throttle established a circulation. The oil being always held in a vessel which was in direct communication with the steam, was always ready for instantaneous vaporization. This would seem to be the acme of perfection in the saving of oil, and the highest possible point of utility in the lubrication of an engine.

Among the claims made for it not before enumerated are, that it imparts a regular motion to engines, because it lubricates the governor valve. It makes the throttle turn easy, keeps it from rusting, and saves packing and the grinding of it. It will pay for itself in fuel every two months, in oil in seven to ten months, and in wear of packing and labor every four months.

These cups are being used by nearly all first class engine builders East, where more than 10,000 of them are in use, and though they have been but recently introduced on this coast they can be seen at work on the engines of the Union Iron Works, Messrs. Prescott, Scott & Co., and in many other of our leading establishments. Any kind of oil can be used in them, but we suppose it is very generally understood now that a regular cylinder oil is best.

Tatum & Bowen, 329 Market street, are the agents for this coast, as they are also for the Albany cylinder oil, and Albany lubricating compound and cup.

General Revival of Mining.

On this coast there has been a genuine revival of mining this year. In several of the old mining counties of California the business had fallen into decay, and beyond a little scratching in gravel deposits and placers the industry had ceased to exist. A few months, less than one year, has worked a marked change. The revival of the important industry has extended not only to placer and gravel properties, but it has reached the long neglected quartz interest. Old claims have been revived, and new and important discoveries made; and the promise is good for an immensely increased product of gold during next year. The revival has been equally as extensive in the States of Nevada, whose chief industry at present is silver mining. This change is most marked upon the great Comstock properties. Never since the discovery of this splendid vein some 20 odd years ago have operations been so stupendous or so systematic. While the work has been beset by apparently insurmountable difficulties, such as grow out of great depth and the enormous volume of mainly hot water, they have been met and overcome by the experienced engineers of the Comstock. They have placed machinery on their mines of phenomenal power, and an intelligent and practical system of ventilation is progressing, which has reduced the sweltering atmosphere and made a fair day's work the rule. In Colorado the bulk of the population seems to be devoted to prospecting and mining, so great has been the impetus given to the industry since the extraordinary developments in Leadville, which for a time overshadowed the interest on this coast.



VISIBLE DROP FEED LUBRICATOR.

The mining region in Utah, in spite of the unfriendly attitude of the dominant factor in the population of the Territory, whose hostility was manifested directly by acts of concealment and misrepresentation for years, has been extended enormously during several years past. There is no longer any doubt as to the mining future of Utah. Some of the most productive mines on the coast are in that neglected Territory. We need only mention the Ontario, Horn Silver and Stormont, to say nothing of a number of lesser properties which are among the constant producers of bullion. Utah to-day is not half prospected; but the signs are rife of a largely increased activity, both in exploration and mining. In the northern Territories of Idaho, Montana and Dakota, the revival of interest in mining, especially in quartz vein mining, is conspicuous. The papers published at the mining centers of those Territories teem with news of operations in mines and with accounts of new discoveries. Their product of bullion is already large, and is steadily increasing. To young men of energy and enterprise those northern Territories present an inviting field, in which doubtless many splendid prizes will be found. Though the last mentioned, Arizona is by no means the least

interesting of our mining regions. Already her mining districts are countless, and new discoveries are reported weekly. Her miners are not only discovering mines to the hand of the capitalist, but they are producing largely of gold and silver. The wealth acquired from her mines will be the means of advancing her agricultural and grazing interests, and will render the future State the fit abode of an enterprising population.

The renewed interest in the mining industry is not confined to the Pacific coast. They have been pushing discoveries of gold and silver in Maine and Arkansas, and now we learn that a degree of activity, amounting almost to a fever, prevails in several of the counties bordering upon the Adirondack mountains in New York. The *Tribune* of the 25th instant remarks that the "New York gold fever rages almost in the manner of what the Californians call the 'ultimate West.' Eight 'mines' were recorded yesterday in the Secretary of State's office. There are times when it becomes a simple resident of the interior to know 'farmer's gold' when he sees it, and to be on his guard against thrifty speculators." This hasty review of this condition of the mining industry throughout the country impels us to believe that it will be largely extended during 1881. Mining for gold and silver has always been fascinating. Apart from the intense pleasure of owning a paying mine; of seeing the hitherto sterile and worthless hill and mountain lands yielding ingots of the precious metals; necessity may compel a larger attention to the business of mining.

Our products of the staples this year have been enormous, and it will be puzzling to find an outlet for the heavy surplus at remunerative prices. The latest advices from both France and England say that the demand for our wheat will be less than last year. In neither country for a number of years has the home supply been so large. There will be less money for the wheat and cotton grower. These considerations will be likely to turn the attention of capitalists and the enterprising generally to the great and productive industry of mining.

PEAT UNDERLYING HAYES' VALLEY.—At the last semi-monthly meeting of the Academy of Sciences, an interesting discussion occurred over the discovery of vegetable peat in an artesian well in Hayes' valley. In boring this well to the depth of 60 ft. plus, the work passed through three or four different strata of peat, each layer being about six inches thick. Specimens of this peat had been thoroughly tested by Mr. C. D. Gibbs, and presented to the Academy. He reported the peat as more or less impure, but excellent for fuel; it burns freely, and leaves a brown ash. The point discussed by the members was, whether this peat, which is unmistakably a vegetable formation, was situated below the ocean level, and whether it revealed a subsidence of the earth's surface at some remote time; or, whether it disclosed simply a deep boghole, which had been gradually filled by the ever-shifting sands of the ocean boundary of this peninsula. It is worthy of mention that Mr. Gibbs is preparing a map and diagram of the various underlying stratifications of this city, and will read a paper on the subject as soon as he shall obtain fuller data. He earnestly requests all artesian well-borers to preserve some samples, or record, of their borings at various depths, and forward them to him, and thus assist in completing a very much-desired geological map of our peninsula. He has already classified over 200 specimens of such borings, and more are needed, especially in some localities.

EXHUMING A MONSTER.—A dispatch from Chicago, Aug. 24th, says that while some laborers were excavating for a sewer in the north-western part of the city they came upon the remains of a mastodon at the depth of 18 ft. below the surface. Among the pieces already secured are a section of the task, 4 inches in diameter at one end and 6 inches at the other, and a tooth weighing 6 lbs.

THE MILWAUKEE & ST. PAUL AND CHICAGO & NORTHWESTERN RAILROADS have obtained permission from the friendly Sioux to cross their reservation on the way to the Black Hills.

CORRESPONDENCE.

Wearmit, unendorsed, opinions of correspondents.—Ems

Something of Bodie District—No. 2.

EDITORS PRESS:—The leading mine of Bodie bluff and one among the most productive on the coast, is the Standard Con. As has already been stated, it has yielded its millions; and judging from the very large ore bodies still in sight, may be expected to produce many millions more.

The next in order of production on the bluff and in the district is

The Bodie Consolidated.

This mine is about as well known as the Standard, and may likewise be dispatched with a very few lines. Its dividends have been numerous; its shipments upwards of \$2,000,000; greatest vertical depth, 625 ft.; has from 7 to 8 months of ore supply, and still sinking on the vein, which continues to average fully as well as in the upper levels. The ledge dips to the east; is said to give every evidence of a true fissure; is now essentially silver-bearing and exhibiting other characteristics of the Comstock. The Bodie Con. and the Mono are on the eve of sinking a joint shaft from 800 to 1,000 ft. east of present works—a line of policy that might be followed with advantage by other companies. Their machinery will be ample for a depth of 2,000 ft.

The Jupiter

Has reached a depth of 600 ft. A winze from the 500 level to connect with the main south drift on the 600, finds a regular two-foot ledge all the way down, with an average of ore varying little in value—the last assays running from \$20 to \$160—the ore extracted being estimated at from \$75 to \$100 per ton. Some very rich quartz was found along the footwall, one assay going to \$150 gold and \$4,300 silver, giving a little forecast of the rich strike in the south drift of the 600 level, mentioned in one of your late issues. The fine ore of the 500 level had been known for some time, and expectations had run high as to finding a larger body of this richer ore below. This late development, in the light of its comparatively great depth, and taken in connection with other recent discoveries, will be likely to infuse some new life into stockholders and give another impulse to prospecting.

The Double Standard.

In this vicinity, has a shaft of 307 ft. and winze from foot of same on the ledge of 80 ft.; width, from 2 to 3 ft.; the ore has given assays as high as \$300.

The Belvidere

Has made some little progress below the 550 level. The apex of an ore chimney was struck at a depth of 170 ft. The ledge gradually widened from this point downward, varying on the 300 level from 2 to 5 ft., enlarging to 6 ft. on the 500, and to 9 ft. on the 550 between walls—ore of rather high grade from 4 to 6 ft. wide on the levels successively. Over 500 tons have been broken down, and the Syndicate mill, with a capacity of 45 tons per day, can be more than supplied with good milling ore from the different levels. On the winze level below the 500 nothing has as yet been done, the rich ore there developed remaining intact, awaiting the completion of the station on the 550 level; meanwhile, the work of sinking, drifting, stoping, extracting and crushing goes on steadily and simultaneously.

Some mention should have been made at this point of

South Bulwer,

Which is situated in a good neighborhood, west of the Mono and south of the Belvidere; but notes of this and two or three other mines have been mislaid.

The Con. Pacific.

Located west of the Belvidere and Standard mines, embraces an area of 1,400 by 400 ft. wide; greatest depth by double-compartment shaft, 600 ft.; stations opened on the 400, 500 and 600 levels; on the 400 a large four-ft. vein was cut and drifts run north and south; ore of rather low grade, from \$10 to \$15 per ton. Another vein of 2½ ft. was cut 40 ft. east, partly filled with quartz worth \$25. On the 500 level east of station the same vein was encountered—here from 6 to 7 ft. wide—the ore from \$15 to \$40 per ton; and also the other vein of 4 ft. in width—quartz of about the same grade as on the 400 level. The company is now running from 600 station to cut these ledges, where a still greater improvement is expected. At a distance of 300 feet north of shaft a tunnel was run north 250 ft., gaining a depth from surface of 100 ft., from which point ledges Nos. 1 & 2 were soon struck, where 100 tons yielded at the rate of \$46 per ton. Winzes were then sunk on the lodes 265 ft. for developing ore the entire distance down. Work will soon be projected from main shaft, by drift, to penetrate the ore bodies, when extracting will commence.

The Bulwer Con.

Consists of 2 ledges, the Ralston or east vein, on the 400 level from 2 to 4 ft. wide, and the Stonewall, 4 ft. at same depth. The ore generally of rather low grade (\$10 to \$20 per ton), the east vein showing some improvement southward.

A winze was sunk 100 ft. from this level (400), where stoping has been commenced, and from which is now being extracted some of the rich-

est ore yet found, indicating larger and more concentrated bodies of ore, as well as of a better quality at greater depths. No crosscutting has been done from bottom of winze, and with the exception of a crosscut now being run from the 700 level of the Standard shaft to tap both veins, this is the only excavation below the 400 level. The total of bullion shipments of mine to date may be set down at \$350,000.

They have any amount of ore above the 400 to keep their mill running for a long time, and with present milling facilities may be able to produce the ensuing year from \$400,000 to \$500,000, but dividends can scarcely be expected before reaching the 700-ft. level.

The Tioga.

Shaft 860 ft., well timbered with square sets; several veins cut. The Yerington on both the 200 and 300 levels, has 4 ft. of good milling ore, and (No. 3) on the 500 ft. averages 2 ft., also of good ore. From lateral drifts on the veins, 400 tons have been extracted and in readiness for the mill. As no stoping has been done, a very large amount of ore is in sight.

The apex of a large silver vein 74 ft. wide has been cut from the 800 station, somewhat broken and mixed with vein porphyry, the ore giving assays from \$5 to \$125 per ton, which may be looked upon as a very promising development. The force is at present concentrated in sinking with the view of opening another level at the depth of 900 ft., where they anticipate finding a much richer and better defined ore body. The Blackhawk on the 220 level has a 4 ft. vein of fair milling ore, on the 320 a 6 ft., but ore not so well concentrated, and in crosscutting east and west from the 700 ft. or lowest level passed through several small veins, one of 3 ft. with well-defined walls, but without any material change in the quality of the quartz.

The Bechtel

Has two well-defined veins; the east, averaging two and one-half ft.; the west, on which a drift was run from old shaft 700 ft. to the south line of claim, is full five ft. in width. Some ore from the northern part of the mine was worked with a profit; that from the south end is of higher grade, running from \$25 to \$30, mill process; total of shipments to date being a little upward of \$70,000, and sufficient ore in sight to keep their (contemplated) mill running at its fullest capacity for two years or more after it is built. A new shaft has been sunk 300 ft., making connection with old works at a point 180 ft. north of south line. The company is erecting hoisting machinery, with a capacity equal to sinking from 1,500 to 2,000 ft., consisting of double engine 120-horse power and 60-inch boiler; four and one-half inch flat cables; reels so constructed as to obviate the necessity of moving the engine to either clutch or unclutch, thereby avoiding any possibility of any accident occurring.

The Syndicate,

Located on the north side of Bodie bluff, consists of two claims, each 600 ft. wide by 1,500 long, and covers several ledges, the principal one 48 ft. in width, and running the entire length of the property. The mine is opened by a shaft 550 ft., drifts and tunnels, the main and longest 2,500 ft., and 700 ft. below the surface at its terminus, at which point a shaft is being pushed down 200 ft. further with the view of crosscutting the ledges. The ore is represented to be all free milling, and a large quantity has been crushed, yielding an average of \$20 per ton.

For reasons previously stated, a few good mines have received no mention; others have been necessarily omitted for want of space. Let the above suffice. A. C. K.

GOULD'S COMET.—Prof. Klinkerfues, of Göttingen, Germany, has published a paper on Gould's comet, discovered in last February at Cordoba. His object is to point out that the probable identity of this comet with those seen in 1843 and 1668 need not be rejected because it does not appear to have been seen, although so conspicuous an object, between those years. So nearly does it approach the sun (within, indeed, about 100,000 miles of its surface) that the resistance to its motion when at perihelion is likely to be sufficient to produce a very considerable diminution in its periodic time, the case being, in fact, one of resistance from the sun's atmosphere itself, and not merely, as has been conjectured in the case of Encke's comet, from an ethereal medium presumed to exist within the orbits of at least some of the planets. Hence there is nothing extravagant in the supposition that the resistance of the part of the corona within which the comet passes may be quite sufficient to diminish its period of revolution from 175 years to 37 years. Carrying this view still further back, Prof. Klinkerfues contends that it is probable that the same comet may be identical with one seen and described by Aristotle in the year B. C. 371, when that philosopher was only 13 years old and still living in his birthplace, Stagira. He considers it likely that while the period of revolution from B. C. 371 to A. D. 1668 was 2039 years, it was diminished by the resistance of the sun's atmosphere, first to 175 and then to 37 years; and further, that it has at the late passages through perihelion been again decreased to 17 years, so that it may be expected that the comet will return in the autumn of 1897.—*Iron Age.*

A HARTFORD inventor has nearly finished a road carriage, to be propelled by compressed air. The compact machinery is under the rear axle, a reservoir holds enough of air for a run of many miles, and the steering is simply done,

Microscopy and Forgery.

A paper on "The Detection of Forgeries by the Microscope," read by Prof. J. N. Wythe, A. M., M. D., before the Microscopical Society: An article in the *Bankers' Magazine* for August, 1878, refers to the value of the compound microscope in the examination of handwriting, beyond the ordinary methods of experts who rely upon unaided vision or a hand-lens. It shows that the conclusions of an ordinary expert are reliable just as far as they rest upon data which can be explained, and no farther. A man who writes his signature frequently falls into a series of rhythmic movements which are peculiar to himself. This may arise from habit, or individuality of muscular organization. His general handwriting may differ in style from his signature, but the accentuation remains the same. A talented imitator may produce this general rhythm of a signature, and cause the testimony of an expert to become vague and uncertain. The expert may detect a difference, empirically, but he is unable to explain it.

To the Satisfaction of a Jury.

"It is just at this point" says the writer, quoting from a letter to the *New York Times*, "where the methods of the expert break down, that the more delicate methods of optical analysis, represented by the compound microscope, interpose to detect and demonstrate forgery." In addition to the larger rhythm upon which the expert bases his judgment, there is a minute secondary rhythm caused by the action of the small muscles in regulating the amount of pressure upon the pen, which is imperceptible to the naked eye, and cannot be accurately determined with a simple magnifier, but which is easily discerned in a compound instrument under a power of about ten diameters, if the writing is strongly illuminated with a good bull's-eye condensing lens. These variations of pressure are between 200 and 300 to the inch, and are regular in proportion, as they are spontaneous and involuntary. When a man writes naturally, the pressure variations are rhythmic, while on the contrary, when he is consciously imitating the writing of another, they are irregular and unsymmetrical. No matter

How Cleverly a Signature May be Imitated.

So long as the writer exercises the voluntary control of the hand, which is essential to the act of imitation, just so long the margin of the stroke can be demonstrated optically to be irregular in the length and the distribution of the waves which indicate the muscular impulses. Thus the compound microscope determines the issue at the point where the coarser processes of the ordinary expert fail. My attention having been called to this subject, I instituted numerous experiments, which have convinced me of the general accuracy of the article, of which the foregoing is an abridgement. Careful investigation enables me to classify the phenomena of hand writing, especially signatures, as analyzed by the compound microscope, as follows:

1. The rhythm of form, dependent on habit or individual organization. This is the main dependence of the ordinary expert. It may be determined by the naked eye or a hand-lens, but is still more easily seen by means of the magnified image in

The Compound Microscope.

In some cases, an enlarged photograph of genuine and deputed signatures may be useful—remembering, however, that the form of letters may change, from time to time, more readily than the general rhythm.

2. The rhythm of progress. This is the involuntary rhythm, referred to above as pressure variations on the point of the pen, and seen as a wavy margin to the letters of signature when well illuminated on the stage of the compound microscope. It is caused, in all probability, by the rapidly successive nerve impulses upon which the contraction of the muscles depend. In age or infirmity, these impulses are perceptible to the eye, and we say that the hand trembles. "But as a matter of microscopic analysis the hand always trembles, and it is an inalienable property of muscular contraction that it should." The regularity of this rhythm is destroyed by a voluntary effort at imitation, and is somewhat interfered with, but not entirely broken, by mental excitement. This rhythm differs in different hand-writings, so that it is well for the examiner, if practicable, to accustom himself to the habitual rhythm of a genuine signature before expressing a judgment on one which is questioned.

The Art of Writing.

Is a most complicated one, requiring the simultaneous action of many muscles. When perfectly performed it should be nearly, if not quite, automatic, requiring very little mental stimulus for its performance. If any act which should be automatic, demands our attention in order to execute it, the difficulty of performance increases. The ordinary mental stimulus suffers an emotional diversion, which causes proportional muscular impotence. Hence emotional disturbance causes a trembling handwriting. In cases of writers' cramp, in which the muscles respond but sluggishly to the will, and render the grasp of the pen faltering and uncertain, this rhythm is greatly exaggerated or interrupted. Paralysis of the ulnar nerve, rheumatism of the shoulder or wrist, neuralgia and alcoholism, may also interfere with the rhythm of progress. But in no case is the failure of the rhythm so marked as in a voluntary attempt at imitation.

3. The rhythm of pressure. By this I mean,

not the involuntary and rapid action of the muscles, producing a microscopic wave as the writing progresses, but a rhythmic alternation of light and dark strokes, which is

Characteristic of some Signatures.

And which, in all probability, is a variety of the rhythm of form; yet, as it is revealed to microscopic analysis rather than to ordinary vision, it may escape the most expert imitator, and so become another factor in making up a judgment in any case.

If the microscopist carefully observes these three rhythms, being careful of the illumination of the letters, he cannot fail to demonstrate the difference between genuine and an imitated signature.

In a recent trial before Judge Crane, in Oakland, I was able to discriminate between imitated and genuine signatures in a large number of cases of remarkable similarity, prepared by a most talented writer, as well as to testify to the genuineness of signatures in which there was

Considerable Variation of Form.

Mr. Geo. C. Hickox, also a member of the Microscopical Society, and well known as an expert in such matters, when his attention was called to this use of the compound microscope, declared to the Court that it was a new and wonderful revelation fixing beyond question the individuality of hand-writing, especially of signatures.

Should this method of investigation be much used, as it ought to be, it would be convenient to have a microscope made for the purpose, having a large stage with clips so as to hold paper of considerable width, a tube of wide diameter to collect as much light as possible, a very low power eye-piece, and a special objective of long focus and large field of view.

CLEAN, THEREFORE HEALTHY.—The Board of Health and the Police Commissioners should study the report Dr. Trowbridge, the United States Consul, sends from Vera Cruz to New Orleans. The death rate of Vera Cruz is now less than during any of the previous years of his 11 years' residence in that city. There has not been a known case of yellow fever or smallpox during the year 1880, and he reports the fact as an encouragement to commerce. And this is the way he explains the healthfulness of Vera Cruz: "I do not expect to be successfully contradicted when I say that this is one of the cleanest cities in the world." And this is the way he explains the cleanliness of Vera Cruz: "Vigilant officers of the Board of Health, assisted by the authorities, have labored intelligently, and have kept the city clean." His report illustrates the truth of our assertion that New York's excessive mortality is the direct product of the filthy condition in which the Police Commissioners permit our city to remain. His statement that officers of the Board of Health have labored intelligently to keep Vera Cruz clean, must seem a reproach to the members of the Board of Health of New York, who have not so much as officially protested against the slaughter of more than 12,000 persons a year permitted by the Police Board. Would vigilant officers of our Board of Health labor intelligently to compel Police Commissioners to keep the city clean, New York would soon be known as the cleanest city in the world, and therefore the healthiest.—*N. Y. Evening Mail.*

WHO FIRST FOUND GOLD.—I have talked with a dozen old pioneers, some of whom were with Marshall or Sutter at the time (Marshall was at Coloma, and Sutter at New Helvetia), and have endeavored to learn the true secret of the Find, but without success. Some of them say that Marshall found the first piece of gold; others that his little daughter found it; others, that Mrs. Winnier, who provided meals for the workmen at the mill, found it; and others, again, that Mrs. Winnier's son found it. Gen. Sutter himself once told me that Marshall was the finder, and, although Sutter was not on the spot at the time, I am inclined to believe this the true story; for, while still fresh, it must have been related to Sutter with great minuteness. It is, however, agreed on all hands, that, if Mrs. Winnier did not find the gold, she was the first to determine its character. Woman-like, she put the doubtful nugget into a soup-pot, and boiled it. The result of that assay was to affect the fortunes of millions of people. Among others it affected Capt. Sutter, for it made him a beggar.—*Alexander Del Mar in Californian for September.*

AN INTENSIFIED ELECTRO-MAGNET.—Dr. Stone recently exhibited before the Physical Society a very interesting electro-magnet of novel construction, and based upon a principle which will probably be applied with advantage in the construction of electro-magnets for dynamo-electric machines and telegraphic apparatus. It is known that electro-magnets enclosed in jackets of soft iron are far more powerful than when the copper coil of wire is unenclosed. The iron jacket has the effect of exalting the magnetic power of the poles. Dr. Stone does not employ a soft iron jacket, but instead of using copper wire to wind the bobbins, he uses best charcoal annealed iron wire about one-fifth of an inch in diameter. Four wires are wound on in parallel circuits, and the current is split up among them in "multiple arc." They are insulated from each other by paraffine wax. By this felicitous arrangement the lifting power of Dr. Stone's large magnet is, with a battery of four or five Bunsen cells, increased fourfold.—*Engineering.*

MECHANICAL PROGRESS.

Economical Cut-off in Steam Engines.

Theoretically the most economical cut-off is readily seen to be that by which the steam at the instant of release has, in the particular cylinder, and under the particular conditions, no capacity for developing further work.

In a cylinder of indefinite extent, having one fixed head and a moving piston between which steam has been admitted to a certain point, then cut off and expanded, the best point theoretically at which to release the steam will be where the pressure has fallen by expansion to the back pressure. This is evident from the fact that up to this point there is an effective pressure upon the piston to urge it forward, while beyond this point the effective pressure is backward, or prejudicial. An indicator card taken from an engine working under these conditions will have a sharp point at the end, or termination of stroke. If the atmosphere is the back pressure, as in case of non-condensing engines, then the release occurs where the expansion pressure equals the atmosphere. In condensing engines it is where the expansion pressure equals the pressure of the condenser, where the back pressure is zero, if possible, it is where the volume of expansion is infinite. For this latter case the above ideal cylinder must be of infinite length.

For all the above cases, the ratio of expansion is equal to the pressure of admission divided by the back pressure, where Mariotte's law of expansion holds; since, by this law, initial pressure \times initial volume = final pressure \times final volume. Or,

$$\frac{\text{initial pressure}}{\text{final pressure}} = \frac{\text{final volume}}{\text{initial volume}} = \text{ratio of expansion.}$$

This result agrees with that obtained analytically by Prof. Wm. D. Marks in the June number of the *Journal of the Franklin Institute*, where the simple rule for finding the most economical point of cut-off, stated in words as that by which the terminal pressure must equal the back pressure, was looked for without success. According to this rule the indicator card shows at a glance when the specified adjustment is realized.

This adjustment of the cut-off is pretty generally accepted by engineers as the best theoretically. But in actual steam engine practice the adjustment will be quite different, for several reasons, such as excessive size of cylinder, causing loss by radiation of heat and cooling by expansion, friction by mechanism, undue strains of parts or increased piston speed, etc. For instance, the size of the crank pin enters into the problem. In practice, the indicator diagram from an engine running under the most favorable conditions, or with the most economical practical cut-off, should show its narrow end cut square off with some considerable breadth, instead of being absolutely sharp; and what breadth it should have is a matter not easily determined. To illustrate, take an example of a non-condensing engine working under 90 lbs. absolute pressure of admission per square inch, cutting off at one-fourth the stroke. The terminal pressure will be seven and a half lbs. above the atmosphere, Mariotte's expansion; but if the cylinder were 50% longer, the terminal pressure would be just the atmospheric, or that required by the solution given by Prof. Marks. The gain in work done per stroke, for the 50% longer cylinder, will, however, be, as found by calculation, less than 4% of the work done without 50% added.

To save this 4%, the engine, for a given establishment, would require to be one-half larger, making the same number of strokes per minute. Or, if the number of strokes diminish with increase of size, it would need to be more than a half larger. Aside from the considerations of greater loss of heat by radiation, cooling of steam, friction, etc., there comes the interest to be paid on the additional investment required in the larger engine. In the light of considerations like the above, which must be familiar to professional as well as practical engineers, it would seem that the qualifications needed to the last sentence in Prof. Marks' article must, through some hurry or otherwise, have been overlooked, but which, it is hoped, will be fully supplied in the article promised soon to follow.—S. W. Robinson, in *Journal of Franklin Institute*.

A CAR ON RUNNERS.—A car has been patented with skates instead of wheels, intended for elevated railroads. It uses grooved instead of T rails. The primary object of this device is to avoid the deafening roar of the cars in passing through such streets as those in the city of New York. The rapid rotation of the wheels causes the rapid vibration of the whole framework of the road, thereby making the noise and tending to loosen the rivets and shake down the superstructure; all of which would be obviated by the skates and the special rails. This special rail should be of polished steel, presenting an edge of three-eighths of an inch surface. The skate need not be over 30 inches long; and the lubrication of grease (not oil) should be the least possible. Experience alone can demonstrate the best adaptations and adjustment, as in the case of all new inventions.

Furnace-Shield.

The intense heat to which "boilers" are subjected in rolling mills, while puddling their heats, is well known, and is generally urged as one claim for extra high wages. The manager of the Sligo Iron Mills, Pittsburgh, has recently invented and applied an ingenious contrivance, by which heaters and puddlers are protected from the fierce heat, and partly also from the intense glare of the molten metal of the furnaces. The apparatus consists of a movable hollow apron or shield of sheet iron suspended in front of the furnace by means of hangers provided with pulleys, which run on a track-bar, so that it can, by means of handles, be easily and quickly pushed aside when it is required to charge or draw a heat. The shield has an arched opening in its lower part, which, when the shield is in position, comes directly in front of the stopper or working hole of the furnace; the sides of this opening being beveled, the usual range of lateral motion required for the puddler's tools is not interfered with. The shield is constantly supplied with cold water, which is introduced at the top, and after running through it is drawn off by a pipe leading to the hosh of the furnace, the water thus serving a double purpose. An air-chamber is arranged at the top of the water-space of the shield; into this chamber air is forced, which having been exposed to the cooling action of the water flowing through the shield, passes into an air-distributing pipe running along the top and in front of the shield. The ends of this pipe are closed, and at its lower side it is perforated and provided with a series of short tubes, through which the cool air is discharged in jets upon the workmen in front of the furnace. The utility of this furnace attachment will be readily understood when it is stated that the shield is a perfect non-conductor of heat, the outside face being always of the same temperature as the water passing through it. It thus effectually protects the workmen from the intense heat of the furnace, enables them to get out their full number of heats and cools off the surrounding atmosphere.

AVOIDANCE OF VIBRATION IN MACHINERY.—We have already made allusion in these columns to the avoidance of vibration in machinery, by the use of asphalt, and now we have an elaborate paper on the subject, read by Mr. W. H. Delano, before the British Institution of Civil Engineers, in which he spoke of the use of asphalt for the foundations of machinery, notably for those running at high speeds, the asphalt having the valuable quality of absorbing vibration. This was instanced in the case of a Carr disintegrator, which, being mounted in a pit lined with bituminous concrete, was worked at 500 revolutions per minute without sensible tremor, whereas with the former wooden mountings on an ordinary concrete base, the vibration was excessive, and extended over a radius of 25 yards. At the Paris exhibition of 1878, there was shown a block of bituminous concrete, weighing 46 tons, forming the foundation of a Carr disintegrator, used as a flour mill, and making 1,400 revolutions a minute, a speed which would have been impracticable on an ordinary foundation. Extensive applications of the material for this purpose are made in France, especially in connection with steam engines and steam hammers.

SMEETING IRON SAND.—It seems, says the *London Times*, that the New Zealand iron sand, as taken from the beach, is mixed with an equal quantity of clay and of the ordinary sea-sand, which contains a large admixture of shell; these materials are worked up into bricks, which are hardened in a kiln, broken up into regular pieces, and smelted in an ordinary cupola furnace. The product of this simple process is cast steel of the finest possible texture, from which some beautiful specimens of the finest cutlery have been manufactured. These experiments were conducted by a mechanic in the government employ, who was restricted to an expenditure of £100, and was therefore only able to erect a furnace of the most temporary description; he, however, succeeded in producing, at the first and only trial, 500 weight of steel in the manner described above, and his success seems likely to lead to further and more extensive efforts to utilize the almost inexhaustible deposits of this ore which exist at Taranaki and elsewhere.

NEW DEPARTURE IN LOCOMOTIVE BUILDING.—A rather curious looking locomotive is in course of construction at Waterson. The machinery will be on top of the boiler, instead of under it, as usual, and the boiler will hang very low on the wheels. There will be two pairs of driving wheels, but instead of having them follow each other, one pair will be on top of the other. The real driving wheels will be the upper pair, and they will turn in the opposite direction from that which the engine is going.

TO PREVENT THE HEATING OF JOURNALS.—Von Heerin proposes a method of preventing the heating of journals by a mixture of sulphur and oil or grease. The fine metal dust formed when a journal runs hot, and which strongly acts upon both journals and bearing, forms a sulphide of sulphur. This compound, which grows soft and greasy, does not cause any appreciable amount of friction. It has been very successfully used by the steamers of the North German Lloyd.

SCIENTIFIC PROGRESS.

The Atmosphere in the Early World.

The deposit of carbon during the palaeozoic age was enormous, requiring a correspondingly long time, because, owing to the great amount in the atmosphere, so much needed to be removed before any sensible effect upon the temperature was produced. During the mesozoic, there being less carbonic acid in the atmosphere, a shorter time sufficed to produce an equal effect. For like reason, the change of temperature during the tertiary was more rapid until about the close of that period, after which no further change occurred, the elimination and supply of carbonic acid seeming to have become equal. Closely allied to the question as to the length of the geological divisions, and in its explanation identical with it, is that which asks why there was so great a difference between the duration of the earlier and later types of life. The length of a geological division is really the length of a certain type of life, and that which accounts for the one accounts also for the other. The facts which have been considered, viz., the abundance of coal and lignite, both certainly of vegetable origin; the smallness of the amount of CO₂ which have been derived from volcanoes; the universal warmth; the present non-existence of the early species; the almost total extermination of species at the end of each of the geological ages; the absence of arctic cold, or other sufficient cause for such extirpations; the appearance of new species, and these always in the direction of progress towards present conditions; the great disproportion between the length of the earlier ages and the later, and the disparity in the duration of the corresponding types; the world-wide extent of these phenomena—all these are in harmony with an atmosphere richer in carbonic acid than the present that they seem to demonstrate its existence. How much carbonic acid there was at first in the atmosphere it is impossible to determine. It now forms only three or four ten-thousandths of the whole. Forty or fifty times that amount would very decidedly affect temperature, partly by its own influence, and much more indirectly, by increasing the capacity of the air for water. One hundred times would increase the warmth somewhat more; but if, after that, ten or twenty times that amount were added, the temperature would be scarcely affected, while the effect upon the flora and fauna of the period would be of the most decided character. In the azoic time the amount of carbonic acid in the atmosphere must have been enormous.—*The Penn Monthly*.

Dust Showers.

M. Dauhree has given an account of the dust showers that were observed from the 21st to the 25th of April, 1880, in the departments of the Lower Alps, Isere and Ain. Heavy dark clouds, resembling a dense yellowish mist, traversed the valleys during the day, depositing a reddish dust with a little water. The neighboring mountains were covered with snow, which assumed a rusty hue to the height of about three kilometers (1,864 miles), and above that height it remained white. The snow, upon melting, left a deposit of a yellowish brown color, a little redder than limonite dust and almost impalpable. When heated in a tube it blackened, with a disengagement of water and some organic matters of a strong odor. With dilute chlorhydric acid it effervesced strongly, showing a considerable proportion of carbonate of lime. Boiling chlorhydric acid destroyed the yellow color and left a residuum which was fusible under the blowpipe into a white globule. This residuum contained numerous flakes of white and colored mica, together with some particles which appeared to be feldspar. None of the particles were attracted by the magnet, so that the dust was not probably cosmic, but it resembles in its structure the sand of Sahara. P. de Jussieu reports a similar shower at Autun, on the 15th of April, in which there were traces of iron and perhaps also of lead. A shower occurred in Sicily on the 10th of April, which is said to have deposited considerable quantities of metallic iron covered with a thin layer of oxide. Prof. Orazio Silvestri, of the Meteorological Institute in Cantania, gives an account of a shower during the night of March 29th—30th, in which the dust contained particles of iron, small infusoria and organic molecules. Some of the particles were spherical, as if they had been melted.—*Comptes Rendus, Fortsch. d. Zeit.*

CRYSTALLINE FORM OF MAGNESIUM.—Des Cloizeaux has examined some beautiful crystals of magnesium, which were presented to the French Academy by M. Dumas. The crystals were obtained by sublimation and are of a white color, with the brilliancy of silver. Their faces are often curved and the edges blunt; the usual form is that of a regular hexagonal prism, terminated by a base which is a little less brilliant than the lateral faces. The edges of the base are often replaced by an annular truncation, the combination of which with the faces of the prism recalls that of tellurium crystals. The culminating angle is more acute than in the other rhombohedral metals—arsenic, tellurium, antimony and bismuth. The crystals are very malleable and sectile, but without visible cleavage.—*Compt. Rend.*

Metallic Deposits on Glass.

Herr Carl Mann describes a new method for producing a brilliant metallic deposit on glass, as follows, his object being to substitute the cheapest sulphides of antimony and lead for silver: When nitric acid is added to a concentrated aqueous solution of tartar emetic solution as long as a precipitate is produced, then filtered, and the precipitate stirred into fresh water, the liquid formed is essentially a basic nitrate of antimony in suspension. On diluting a portion of this milky liquid and boiling, the precipitate dissolves in the hot acid liquid. If a little of this hot solution is poured into a hollow glass vessel and cooled as rapidly as possible by shaking or holding it under running water, the liquid becomes milky and deposits a very thin film of the antimony salt on the sides of the glass. On washing it out with cold water and passing sulphuretted hydrogen gas into it, or pouring in a solution of the gas, the glass appears of a uniform faint yellow color; the sulphide of antimony formed adheres very firmly to the sides of the glass after washing and drying. By repeating this procedure several times, the film can be increased very considerably within certain limits. Such glasses appear of a beautiful golden color, with a green reflection. If sulphuretted hydrogen gas be passed into an aqueous solution of oxide of lead in an excess of metaphosphoric acid, a portion of the sulphide of lead will, under proper conditions, adhere firmly to the sides of the vessel in which it is precipitated. The vessel will then have different metallic colors by reflected light, according to the thickness of the film, and darker when thicker. By transmitted light such a glass has a yellowish-brown color. The lead solution may be prepared by dissolving 1 part phosphoric acid in 4 parts of water; also a second solution of 1 part sugar of lead in 20 parts of water, and a third of a strong decoction of sassafras, or an aqueous emulsion of an ethereal oil, such as turpentine. To cover a glass ball with this lead film, three volumes of the phosphoric acid solution are poured into the ball, then four or five of the lead solution, and as much of the sassafras solution. The total quantity of the liquid must be sufficient to easily cover the interior on tipping it slightly. If a thin film of the antimony be deposited first, the lead film adheres better. The sulphuretted hydrogen gas is passed in, and the vessel kept moving, to bring it in contact with every part of the glass. It is afterwards washed and dried.

WEATHERING OF STONES.—In a paper read by Prof. Geikie, before the Royal Society of Edinburgh, the author records the results of certain observations on the weathering of tombstones and monuments in graveyards, with a view of measuring approximately the rate at which atmospheric degradation takes place under natural conditions. The calcareous rocks (marble and limestones), as might be expected, yield quickly as a rule to atmospheric agents. In some cases slabs have been worn down a quarter of an inch in less than a century by the superficial solution of rain containing carbonic and sulphuric acids; in others they are found to have been disintegrated internally, so that the very substance of the marble crumbles away; and in a third series of cases, where the slabs have been inserted in a framework of solid stone, the expansion of the slabs has caused outward curvature and ultimate fracture. In sandstone the effects are more varied. Where the stone is flaggy or distinctly bedded, and the lamination is exposed to the action of the rain, or where the rock is not of homogeneous composition, the destruction has been very rapid, the flakes scaling off and leaving a raw, bare surface. Slabs of freestone and other unlaminated sand rocks Prof. Geikie, however, finds to be so enduring that the sharpness of the cut letters is scarcely blunted in the slightest degree by a century's exposure.

EFFECT OF POLARIZATION UPON FRICTION.—Herr Koch has made an interesting experiment showing the effect of polarization upon friction, the result appearing to have a bearing on the action of the Edison friction telephone. When a plate of platinum or palladium is polarized by means of an electric current, the friction of these metals against a plate of moistened glass increases immediately. To measure the friction, Herr Koch uses the metal in the form of a hemispherical button resting on the bottom of a glass cup filled with pure or acidulated water. The button serves as a pivot to a magneto needle, which oscillates under the action of the earth; the decrease of the oscillations measures the friction of the pivot. Polarization is produced by the current of the Daniel element, one pole of which communicates with the metallic button, while the other terminates with a platinum wire entering the water of the cup. The polarization by hydrogen produces no effect, but polarization with the pole oxygenated is found very efficacious. The friction was increased, through this polarization, in the ratio of two to three, and sometimes in that of two to four. This increase of friction appears immediately after the circuit is closed, and disappears immediately when the current is reversed; but it disappears slowly, like the polarization itself, when the circuit is merely opened. Palladium behaves like platinum. Gold gave no effect.

GLADSTONE MINE.—Plymouth cor. *Ledger*, Aug. 21. This mine, 1 mile north of Plymouth, is being vigorously prospected. Rich specimens have been found now and then by hunters, in the surface croppings. The shaft is down 40 ft, but no ledge of importance has been met with. On the surface large boulders of quartz are seen projecting from the ground over 50 ft wide. The gouge in the shaft is rich in sulphurates.

PIONEER.—The tunnel of this mine is being re-opened. It is over 200 ft in length, and runs through hard slate. A well defined ledge, 8 ft wide, was discovered, the rock of which prospects well. Near the end of the tunnel it had cave occurred, preventing further operations without ample means. It is expected that this week the new company will commence operations.

NOTES.—Two astraras are being fixed up in the creek bed. They will be employed to grind the sand that comes from the mill. It is a good move, and one which I think will pay. There are many prospectors at work, and the town looks livelier than I have seen it for years.

SUTTER CREEK NOTES.—Cor. *Ledger*, Aug. 13: The new Mahoney 40-stamp mill is now being put together, and is beginning to assume somewhat the shape of a mill. The machinery is arriving every day—heavy shafting material, self-feeders, pulleys of different dimensions, etc. The mill will be being run on the rock from the Mahoney in a short time; it is to be hoped that we will bear the sound of 340-stamp mills in this town.

JACKSON NOTES.—*Ledger*, Aug. 21: In the Kennedy mine the middle shaft, to which operations are confined, is now clear of water, the hoisting machinery recently put in having taken it out in a very short time. This machinery is operated by water power, by means of one of Knight's wheels, and is a complete success in every respect. The construction of a small reservoir on the top of the hill, 10 inches will be sufficient to run the works. The shaft is 200 ft deep; at this depth a drift run west, and had just entered the ledge when work was suspended two years ago. It is to ascertain the extent and quality of this ore body that present operations are directed.

ITEMS.—The 10 extra stamps have been put into the Monticard mill, and the full 20 stamps have been kept running steady for 2 weeks past. Reports reach us that a ledge of paying quartz has been struck in the Morganti mine, at Hunt's gulch, within the last few days. At the Zeile mine the quartz appears to be improving in quality. The building of the sulphuret works is being pushed.

BUTTE.

MIOCENE GRAVEL CO.—Oroville *Mercury*, Aug. 20: Water is now running in the Miocene ditch as far down as the lime kiln, 13 miles from the fountain head. It is thought that the stream will be running into Coal canyon, 7 miles further this way, within three weeks—providing the lumber company keeps the flume free supplied with the necessary material. Should nothing occur to upset present calculations the company will be ready to begin work on the lower end of the ditch. The 30-inch pipe of 30-inch pipe, made from No. 4 iron, has been completed for the company by Brock & Taber, and the latter firm are now engaged in filling another order for 800 ft of 22-inch pipe made from the same quality of iron. All of this pipe will be used in the workings of the mine.

BANNER MINE.—The main shaft and levels have been cleared of water. The frame-work of the mill is in position and the machinery is being put up. It is expected that everything will be in readiness to crush rock by the 10th of September.

NOTES.—William Gregory bought \$7,000 in gold to this city, Wednesday. It came from the claim known as the Gregory & Welsh, situated on Table mountain near Oregon gulch. Three-fourths of the amount was in a block, the remainder being nuggets.

NIMBLEW DISTRICT.—Mr. J. K. Smith, just returned from this district, informs us that a company of Eastern capitalists have bought the famous Meredith mine, and intend to develop it thoroughly. Meredith and a companion took out some \$16,000 in 13 months and didn't have one-third of the gold, as Indians have picked nuggets between from one to three ounces each out of the tailings.

NOTES.—Mr. McSmith says there is more gold in that section of the county, yet undeveloped, than in any other portion of the State; he also states that there are at least one dozen ledges, situated within a half mile of the Meredith, equally as valuable as that deposit. He has a prospect of making it thoroughly. Meredith is now busy preparing for next winter's operations. This claim is promising big returns. Prospectors are not very numerous in the district, which state of affairs is probably owing to their ignorance of the existence of such an inviting field of labor.

GRAVEL STRIKE.—A very rich and extensive deposit of blue gravel has been struck by Woodson & Co., in a tunnel they are running at the forks of Butte creek.

NEW BUTTE MINING.—*Chronicle*, Aug. 18: Parties on Butte creek who own valuable claims which cannot be worked by the Shepard ditch, have located a new ditch, commencing about 200 ft below the Cherokee head dam, running down the west side of Butte creek and terminating at Centerville. The capacity of the ditch is to be 4,000 inches, and the new company have a capital of \$150,000.

CALAVERAS.

GWYN MINE.—*Chronicle*, Aug. 21: Very encouraging reports come to us from this mine. All the batteries are in full play and excellent rock is being crushed. No work is being done in the north levels at present. The rock is all taken from the south levels, where the quartz is remarkably rich. We are told that things never looked better at the mine than now.

WEST POINT NOTES.—The Eureka has made a final clean-up for the season. We have not been informed in figures of the amount realized, but from what we can understand it was an unusual clean-up, fully coming up to the expectations of the owners. A vast amount of gravel has been washed away, for the work has been vigorously carried on day and night during the whole season, and a large quantity of water—2 pipes playing continually—and a large force of hands, is the result of the 35ers. The gravel has been kept immediately upon the line, in a ditch with a view to completion before the rains set in, and also to put the claim in readiness for next winter's operations.

WEST POINT NOTES.—Cor. *Chronicle*, Aug. 15: We still keep going ahead with our mines. Everyone appears to look forward to the good times coming when West Point will be classed as one of the best mining camps of the State. The mine at Westfield, and the better of the 35ers, is the calorator of California. No idlers now, no idle mills, and the calorator of Our hydraulic are still working on the precious metal, and everyone is busy.

EL DORADO.

CALIFORNIA W. & M. CO.—*Mountain Democrat*, Aug. 21: Hon. Thos. Findlay, manager of the California water and mining company, informs us that greening is progressing satisfactorily on the new mill at Greenwood. The old system of hydraulicising seam mines was a failure or the simple reason that nine-tenths of the gold was carried away with the tailings. To pay, the vom-matter of the seams must be crushed.

PROSPECT FLAT MINE.—Lately there was a rumor that the mine was paying richly, and that the owner had been investigating this rumor. While we were not sure just what the mine is yielding, we find that the owners have let a contract for adding 10 stamps to the 10-stamp

and the demand for laborers is brisk,

Extreme Rarity of Premature Burials.

[Prof. William See, M. D., in *Popular Science Monthly*.]

A former article on "Premature Burials" in the *Monthly* asserted that, in effect, the ordinary physician is not capable of reaching a satisfactory conclusion upon the signs of death; and as the tendency of the article was to magnify the importance of the probabilities of premature burial in cases of trances and suspended animation, the writer has thought it proper to brief in what follows his opinion of the medical jurists of the present day upon this subject. The only motive in preparing this paper has been not to contradict the fact that premature burials may have taken place, and under the most unhappy circumstances, but to place renewed confidence in the ability of the ordinary general practitioner of medicine to recognize the distinction between a state of trance and a state of death, and to induce a disregard of the idle stories of ignorant and superstitious persons about premature burials.

In discussing this subject, how far are we justified in taking the statements of the earlier writers? The credulity of the public in similar matters is sufficiently shown in such works as Carpenter on "Mesmerism, Spiritualism," etc., and Hammond on "Fasting Girls," to induce us to view general statements with much suspicion. M. Fontenelle has published 46 cases of premature burial from the time of Plutarch downward. Taylor, from whose work on medical jurisprudence this article draws freely, after a careful examination of all these cases, rejects the greater number of them simply because they are drawn from such sources as to render them perfectly inadmissible as evidence. M. Carre, in 1845, published the assertion that 46 cases had occurred since 1833. Taylor examines his cases, and finds that no particulars by which their accuracy can be tested have been given. The whole subject, as taken from the tone of the article now commented upon, and from public opinion in general, resolves itself into two statements, viz., that it is quite possible, and has been proved, that a state of trances, prolonged and of a nature to simulate death, may exist and deceive even those whose daily avocations make them familiar with death itself; and that many cases are on record where changes in the position of the body, and even where the birth of children have taken place after interment.

For the existence of a trance state sufficient to simulate death, all appreciable movements of respiration and circulation must be suspended for a considerable length of time, and there is but one properly authenticated case on record as accepted by physiologists; even this case will not bear too close discussion at the present day. We are told in works on physiology that a Col. Townshend was able at will to suspend animation to the extent of obliterating any perception of the heart or pulse beat, and of any respiratory movement, as a mirror held over the mouth and nose showed no dimness of its surface; and further, that he was able to continue in this condition for the space of half an hour; at the end of this time gradually the signs of returning vitality began to assert themselves until a perfect restoration of the functions of life ensued. From the description generally given, we are led to suppose that this was done not once but several times, and that the subject was under careful inspection by medical men during the continuance of this state. But Braid, in his "Observations on Trance," tells us that Col. Townshend, as a patient of Dr. Cheyne, was in the last stages of a chronic kidney disease when, *nine hours before his death*, he made known to his medical attendants his conviction of an ability to "die or expire when he pleased, and yet, by an effort or somehow, he could come to life again." This he tried before Dr. Cheyne, with the result as just recorded. This case happened nearly 150 years ago, and, in view of its occurring only once and under such peculiar circumstances, with no details as to the extent and accuracy of the means taken to obviate all sources of error, leaves room for the skeptic, without casting a slur upon the good name and reputation of Dr. Cheyne, to express strong doubts upon its probability.

A case which has interested the medical profession very much and is of recent date, is that of the late Dr. Groux ("Proceedings of the Medical Society, County of Kings," Vol. III, p. 350 et seq.), in whose person there existed from birth an opening or fissure in the breast-bone (sternum) which he could extend by forcible separation to the width of two inches. He was supposed to have possessed the power to arrest the action of the heart at will—for a duration of about 20 seconds—but without any other disturbance of his usual condition. The arrest of the heart's action in this case is affirmed positively by some, doubted by others; one examination by three medical gentlemen developed no stoppage of the heart's action, but merely a stoppage of the pulse at the left wrist, attributed to the unusual mobility of the collar-bone (clavicle), by which the artery (subclavian) passing under it to the wrist was compressed.

Medical jurists, after carefully examining all evidence that can be accepted upon such cases, have concluded that it is impossible to suspend animation or to simulate the same, without detection by the ordinary means, for so long a space of time as one hour; and it is fair to assume that when such cases are reported they are due to gross negligence, for where the medical practi-

tioner does his duty and calls in to his aid the ordinary means as taught in all the medical schools, of listening at proper intervals and for a sufficient length of time for the heart-beat, he will find that no heart can intermit its beats—that is, remain in perfect repose—for a space of five minutes in time. Cases are cited in newly-born children where 20 minutes have been supposed to elapse after suspension of the heart's action before resuscitation took place, but these are considered as due to imperfect or careless tests.

The respiratory movements coincide generally with the heart's action; all respiration ceasing, this heart never continues to act longer than five minutes, and these movements can be noted by the non-medical observer, by placing a piece of looking-glass, or a dish filled with water or mercury, upon the chest, and allowing the light to be reflected upon the surface; the slightest movement will result in oscillations.

A common mistake of death for a supposititious trance state is the continued or increased warmth of the body, which is so remarkable in some cases; there are instances where days have elapsed before the body was allowed to be put in the ground, because of its continued warmth, and of the absence of the corpse-pallor; and again it has been frequently noted in cases of death from cholera that bodies, which at the time of death were moderately cool, have developed a temperature of 87° Fahr. and of 92° Fahr., and in cases of death from injuries to the nervous system, even a much higher temperature has been reached—evidences, as Taylor puts it, of some latent vital power or chemical force still lingering about the circulating system.

While the trance state is a source of mystery and wonderment to the popular mind, the positive statements of a change of position in a body, and even of the birth of children after death, are something more tangible and real, and carry their convictions in a more decided manner. Yet these phenomena in many cases are accounted for in the most natural way. There is inherent in the muscular tissue of our bodies a certain irritability or tonicity—vitality, perhaps, is a good expression—of the muscle itself, which is independent of the brain, nerves, circulation, or respiration, in that it continues to exhibit its function—that of muscular contraction—for an appreciable time after death has abolished these forces, and physiologists, by supplying the muscles with nutrition, such as the injection of defibrinated blood, have been able to excite this irritability so late as 16 hours after death. It is this irritability which results in the *rigor mortis*, or rigidity of death, and which sets in generally within five or six hours, lasting from 16 to 24 hours. With this rigidity is a muscular contraction usually not resulting in any change of position of the body; but the flexor muscles exhibit a greater tendency to contraction than the extensors, and there are instances where this contraction has been quite marked, resulting of course in a change of position. If a body be not properly laid out and placed in a coffin in the cramped position in which *rigor mortis* has set it, there will necessarily be some change of position when, at the end of the time mentioned, this condition passes off and a relaxation ensues. In one case of death from cholera, half an hour after complete cessation of circulation and respiration, the muscles of the arms underwent spontaneously various motions of contraction and relaxation, continuing for upward of an hour.

SIX CENTURIES OLD, AND UNFINISHED.—There is, in truth, something very noble in that love of art and its highest creations which was for so many years a ruling principle in the Florentine municipality, and is nowhere more strikingly displayed than in the decree by which Arnolfo di Cambio, in 1293, was ordered to undertake the building of their cathedral church of Santa Maria del Fiore. Plans were prepared, but Arnolfo dying in 1300, the same year in which Dante was chosen one of the Priors of the Arts, the work stood still until Giotto was appointed master builder, and assisted by Andrea Pisano, continued the erection of the cathedral according to Arnolfo's design. The building was, however, frequently interrupted, and, in spite of the lofty spirit in which it was commenced, it was only by slow degrees and at long intervals that the cathedral arrived at its present condition. In a few years more we may hope to see finished the facade, and thus we shall be able the better to admire and appreciate Giotto's tower and Brunelleschi's cupola, triumphs of architecture, commensurate with the grandeur of the idea from which they emanated.—*Cor. Geneva Continent*.

THE INDUSTRIAL PROGRESS OF THE UNITED STATES.—The astonishing progress of this country since the war is the subject of remark by the *Baltimore Gazette*, which cites a well-known statistician as authority for the statement that in the 14 years since 1865 the aggregate production of wheat and barley has trebled; corn, cotton and tobacco more than doubled; oats increased nearly 140,000,000 bushels; potatoes nearly doubled, and hay increased nearly one-third. The cotton crop of 1878 and 1879 was the largest ever raised. The ten crops from 1852 to 1861, raised by slave labor, numbered 34,995,440 bales. The ten crops of 1870 to 1879, inclusive, raised by free labor, numbered 41,454,743 bales. In tobacco, also, the South has achieved a gratifying increase in the annual yield. "The possibilities of our agricultural interests," in the language of Mr. Porter, "are as yet an unknown quantity."

Graphite—American Manufacture of Pencils.

[Read Before the California Academy of Sciences by C. D. GIBBS, C. E., Aug. 2, 1880.]

Graphite is a mineral substance of a lead or iron-gray color, a metallic luster, soft to the touch and staining the fingers with a lead-gray hue. It is also called plumbago and black lead; but the latter name is incorrect, as it contains no lead. Its composition is similar to that of anthracite coal, it containing usually 90% to 95% of carbon, with from 4% to 10% of iron, and traces of silica, alumina, lime and magnesia. Graphite is found in crystalline rocks, especially in gneiss, mica slate and granular limestone. Its chief use is for making pencils, crucibles and portable furnaces. It is also employed for diminishing the friction of machinery, and for giving a gloss to the surface of cast iron.

About a century ago the most valuable mine of this mineral, containing the finest quality for making pencils, was at Borrowdale, in Cumberland, England. The entrance of the mine was protected by a strong building, and a guard stationed over it to keep the miners from stealing the mineral. It was only worked six weeks annually, and the net produce of the six weeks amounted to from \$150,000 to \$200,000.

Pencil Manufacture.

The word pencil is used in two senses. It signifies either a small hair brush employed by painters in oil and water colors, or a slender cylinder, of black lead or plumbago, either naked or enclosed in a wooden case, for drawing black lines. The last sort is the one to be considered here.

The best black-lead pencils of England are formed of slender parallelepipeds, cut out by a saw from sound pieces of plumbago, which have been previously calcined in close vessels at a bright red heat. Another method consists in finely pulverizing the graphite, and then by a very heavy pressure, obtained by machinery, condensing it into thin sheets. These sheets are then sawn up of the sizes required. The pencil is pure graphite; and the foliated variety is preferred on account of its being freer from impurities.

The point at which I wish to arrive in this article, is to show that by American ingenuity and the novel features in the application of machinery, one firm is able to turn out so many pencils that it is calculated they produce one-third of the entire number used annually in the U. S.; and are supplanting pencils of the European make. And the pencils are made from graphite, specimens of which are here presented.

The American Pencil Trade.

The pencil works of the Dixon Company are situated in New Jersey, the Graphite mines and mills at Ticonderoga, N. Y., and the Cedar mills at Tampa, Florida.

Graphite of great purity is found at Ticonderoga, N. Y., both in the form suitable for crucibles and for the production of what are erroneously known as "lead pencils." The graphite is reduced in mills to a fine impalpable powder, almost as mobile as water, and making the fingers as smooth as if they had been oiled. Pure clay, or clay containing the smallest proportion of calcareous or silicious matter, is the substance which is employed to give aggregation and solidity, not only to plumbago dust, but to all sorts of colored powders. That earth has the property of diminishing in bulk, and increasing in hardness, in exact proportion to the degree of heat it is exposed to, and hence may be made to give every degree of solidity to pencils and crayons. The clay is prepared by diffusing it in large tubs through clear water, and letting the thin mixture settle for two minutes. The supernatant milky liquor is drawn off by a siphon from near the surface, so that only the finest particles of clay are transferred into the second tub, upon a lower level. The sediment, which falls very slowly in this tub, is extremely soft and plastic. The clear water being run off, the deposit is placed upon a linen filter, and allowed to dry. It is now ready for use.

We now come to

The Third Method of Making Pencils.

The pulverized graphite is calcined at a heat approaching to whiteness. The action of the fire gives it a brilliancy and softness which it would not otherwise possess, and prevents it from being affected by the clay, which it is apt to be in its natural state. The less clay is mixed with the plumbago, and the less the mixture is calcined, the softer are the pencils made of it; the more clay is used, the harder are the pencils. Some pencils are formed of two parts of plumbago and three parts of clay; others of equal parts. This composition admits of indefinite variations, both as to the shade and hardness; advantages not possessed by the native mineral. While the traces may be made as black as those of pure plumbago, they have not that glistening aspect which often impairs the beauty of black-lead drawings.

The materials having been carefully mixed according to the degree of "hardness" desired in the pencils, and the substance having been reduced to a dough form, it is placed in a cylinder, within which a screw works a well-fitting plunger, and at the bottom is the plate having holes of the shape and size of which the "lead" is to be cut. As the coils of tenacious material

issue from these holes, they are cut in lengths equal to three pencils, strained, flattened and baked.

It has been found possible to run a coil four thousand feet long without breaking; such a length of unbroken pencil material having been shown by the Dixon Company at the Philadelphia Centennial Exhibition.

From the mills in Florida the cedar is brought to New Jersey, not in logs, but blocks seven inches long, and these are again cut into strips measuring three and a half inches wide by three-sixteenths thick.

This last fact reveals two differences between the methods usually employed in Europe, for the pencil strip is in this factory made of the width to yield six pencils, instead of being cut single and both halves of the pencil are alike; and not, as in the older method, one portion narrower than the other, both sides are equally grooved; and the process of filling the slips, which is done by hand, is exceedingly interesting. Each girl engaged in filling takes up a grooved slip in one hand and a bunch of the straight "leads" in the other, and with a dexterity begotten of practice, very rapidly inserts six of the stalks in the slip; this being banded to a second girl, and the latter receives from a third worker the second half of the slip, over which a brush of hot glue has passed. The two halves are brought together, each one, it will be remarked, embracing half of the "lead," and then, when a row of these slips has been filled, they are pressed under a screw frame till the glue is dry. The next process is to smooth the ends where the "leads" project; and then we reach another interesting machine. In this machine a revolving cutter seizes the slip and with two cuts removes the superfluous wood, separates the pencils, and rounds them into shape. The pencils fall from this machine in a continuous stream, or rather in six continuous streams, each pencil finished for use, and so smooth, it is said, that the finest sand paper would scratch them.

The chips falling from this machine are sucked away by a blower into the engine room and consumed as fuel, with the result of keeping the place perfectly free from rubbish.

The next curiosity is the counting-board, a grooved board or table, on which by rubbing a handful of pencils over it, and seeing that each groove is full, a gross of pencils can be accurately counted off in five or six seconds. Other ingenious machines are in use for staining and varnishing the pencils, stamping marks and names, and finally packing them in a singular and convenient method—the package being oval in shape. Eighty thousand pencils are made daily; and it is said that by the use of checks on the quantity of material given out, that if even one pencil is abstracted it will be missed.

THE CHRYSOLITE MINE.—The actual condition of this notorious Colorado mine has for months furnished the subject for much direct and random writing on this part of the press and correspondents. The conduct of the engineers who examined and reported upon the property has been condemned severely, if not critically and justly. This state of things has proved an irksome strain upon patience. Accordingly, the *Engineering and Mining Journal*, of which Dr. R. W. Raymond is one of the editors, puts the facts of the Chrysolite's history in a nutshell. That journal says: So far as the probable truth can be eliminated from the mass of sensational and stock-jobbing rumors, it appears to be that, in the absence of Superintendent Keyes, the work of development of the mine and the preparation of stopes had not been pushed with sufficient energy to secure the maintenance of a large output; that the daily product of the mine has, in consequence, fallen off greatly; but that the grade of the ore remains good; that the direct and indirect effects of the strike and of the diminished output have altered for the worse to some extent the financial situation of the company, as prophesied in Dr. Raymond's letter from Leadville last May. In other words, although the company, from all that we can learn, has reduced its indebtedness of that date, it has not reduced it as much as was then expected. It is very likely that several months may elapse before the payment of dividends can be resumed, if the policy of paying debts before paying dividends is to be adopted and adhered to. There is nothing in all this to warrant the stories that have been circulated against the value of the mine, and we are sorry that the people who are making fortunes out of the panic they have themselves created should have been able to use the *Mining News* for that purpose.

STRIKE IN A NEVADA MINE.—The *Eureka Sentinel* of the 6th inst., learns that an important strike has been made in the William mine, in Prospect mountain. About one week since a horizontal cave was encountered in a drift on the 360 level. Good ore at once came in, and the body has been steadily improving to the present date. The ore body has been represented to the *Sentinel* as being about eight ft. in width. Its dimensions in other directions have not yet been determined. The discovery was made at the lowest point reached in the mine. The fact that the ore carries a larger per cent. of lead (47) than usual, leads the fortunate owners to believe that they have made a development unequalled on the mountain for its value and permanency. The Williams has always been a first-class mine, yielding ores immensely rich in gold. Now that a great bonanza has been discovered there is no estimating the value of the property.

Mechanical Progress.

The truth of the old proverb, "Necessity is the mother of invention," can no where be better demonstrated than in California. The pursuit of industries under the peculiar conditions which prevail in this new world has brought to light a host of needs, and these needs have spurred painstaking and ingenious inventors to their best achievements. The result is, we can point with pride to the many mechanical triumphs which have been won in the city workshops, at the country forge, in the miner's cabin, and by the farmer's fireside. It can be truly claimed, we believe, that in no part of the country have there been brought forward so many useful inventions, in proportion to the population, as in California; or, in other words, no where else in the United States have so few people found so many new and successful ways and means of attaining desired ends. This is one of the most interesting features of our grand industrial progress, and at the same time one secret of it. We have vast and rich natural resources, it is true, but it is the skill of the inventor, and the enterprise of the men who have used his materials and methods, which have developed these resources and given us a prosperous State.

It is not within the limits of our space at this time to enumerate the individual achievements which have ministered to our industrial advancement. Indeed a volume might be written upon the subject without exhausting it. We can only allude in a general way to the point proposed, trusting to our well-informed readers to trace the steps by which our distinctive position has been attained. Our oldest industry, mining, has been developed from the crude practices and implements of the argonauts into systems of mechanism and processes which are far in advance of those employed in mining operations elsewhere. Our foundries have in their pattern-room shapes and forms of material which, to the skilled eye, convey ideas of amounts and speed of accomplishment greater than any other mechanical engineers have attempted. Our chemists and metallurgists can show methods and appliances which cannot be illustrated anywhere else in the world. The 30 years of active mining on this coast has done more for the development of mining art than have centuries in the older mining countries. Nor have the achievements in the mines themselves been less significant than in the machine-shops and the laboratories. Old methods of working mines proved as inadequate as the old tools and machinery, and the practical miner joining hands with the inventor, the machinist and the scientific student of materials, has forced the mining industry of this coast into a position which, for originality and adaptation of means to ends, is in many respects unequalled. The result is that the experts of all nations come to us to learn methods and mechanism, and their reports well define our standing.

In agriculture, which is now the leading industry of our State, there has been a line of mechanical progress as clearly marked and as beneficial in results as in mining arts. Our farmers grappled with conditions so novel that their experience elsewhere was but of little avail. In fact the earlier years of California farming was in many respects marked by the failure of what seemed feasible, and this was followed by the success of what seemed impossible. Here, too, is material for a volume, and we cannot enter upon it. Suffice it to say that the throwing down of old practices and the gradual development of new called for an almost entirely new fashion of mechanical devices, and this has been brought into existence by the patient labors of our inventors and manufacturers. In amount and cheapness of work accomplished the agricultural machinery of California is altogether without a rival in the world.

Bearing in mind these two grand lines of mechanical progress developed in our State, it is little wonder that an institution with the honorable aims and practical value of the Mechanics' Institute has grown and flourished in San Francisco, which is the center of our industrial system. It is little wonder that the fairs which have been held have been regarded as the occasions for bringing to public notice the triumphs which skillful workers have secured. We expect that the fair which is now beginning will take its proper place in the series of exhibitions, and will be an exponent of our signal advancement in industrial arts, showing to all the progress which each individual worker has secured, and giving to all an opportunity for study and contemplation of our natural resources and the means for developing them in the interest of mankind.

A NEW NICKEL ALLOY.—Alumi is the name given to a new alloy of nickel and aluminum, for the composition of which the United States letters patent have lately been granted. It is intended to be used in place of nickel anodes in electroplating. It is said to deposit, under the influence of the electrical current, a white, smooth surface, susceptible of taking a high polish, and giving a soft, silvery appearance.

PETROLEUM is now used for the illumination of all except three of the lighthouses of the coast of France.

USEFUL INFORMATION.

THE NORTH POLE.—The most vigorous efforts to reach the North Pole, or to make any near advance to it by means of direct approach from any one given point, having all proved failures, a new plan of action has been suggested—that of reaching it much after the plan of a military investment. It is now proposed to establish a circle of permanent observing stations around the northern polar region. In the furtherance of this proposition, the Danish government has resolved to establish a station in West Greenland; the Russian government will establish two, one at the mouth of the Lena, and another on the new Siberian islands. The U. S. has resolved to plant an observatory at Point Barrow in Alaska, and it is expected that Canada will occupy some central point on her Arctic frontier. Holland has provided funds for a station in Spitzbergen, and Norway will select some point in the northern extremity of Finmark. In addition to these national undertakings, Count Wilczek will place a corps of observers upon Nova Zembla. The line of this circumvallation, by posts of observation, will not be far from 4,000 miles in extent, along which the observers will be placed at an average of only about 500 miles distance from each other. It is possible that this may lead to some plan of advancing posts, and keeping them up within supporting distances upon some more or less direct line. In this way, it is thought, the Pole may be eventually reached, and the circumpolar regions explored and mapped in aid of science, if not for the advancement of commercial interests.—*Californian*.

NEW VARIETIES OF TEA.—An English consul reports the discovery of two curious varieties of tea on the western frontier of China. In the monasteries on Mount Omi (or Ngomi) he was given an infusion of tea which is naturally sweet, tasting like coarse congo with a plentiful addition of brown sugar. It is only grown by the monks on the slopes of the mountain, and two days' further west its existence was unknown. The other variety, odd as it may appear, has the natural flavor of milk, or, perhaps, more exactly of butter. What is most interesting is the fact that it is wild tea, growing in its native elevated habitat without cultivation. This wild tea is found in the uninhabited wilderness west of Kiating and south of Yachow, at heights of 6,000 ft. and upward, and is a leafy shrub 15 ft. high, with a stem 4 inches thick. Every part of the plant, except the root, is used for making the infusion; the wood is chopped up and put into a kettle of water with the dried leaves and twigs, and being boiled yields a strongly colored but weak tea, possessing a buttery flavor, which gives it some resemblance to the Thibetan preparation.

DRY FOG.—It has been frequently noticed that during fogs near large towns the air is not saturated with moisture, the dew point in one instance being as much as 10° C. below the temperature of the air. Seeing the possible connection between this phenomenon and the fact that the evaporation of water is greatly retarded by its surface being covered with a film of coal tar, the author made a series of experiments on the comparative rates of evaporation of water, when freely exposed to a current of air, and when covered with a film of coal tar or of coal smoke. It was found that the film retarded the evaporation from 92.7% to 66.6%. The results of these experiments point out a condition of very common occurrence, competent to produce "dry fog," while they also explain the frequency, persistency and irritating character of the fogs which afflict our large towns.—*E. Frankland, Proc. Roy. Soc.*

EMERY PAPER is frequently found lacking in retaining equal efficiency, the fresh parts hitting too much, and the paper soon getting worn through in many places. Emery has been tried on linen, but with little success. A paper or board has been recommended in which emery enters as a constituent part. It is advised to employ fine and uniform cardboard pulp, with from one-third to one-half its weight of emery powder thoroughly mixed with it, so that the emery may be equally distributed. The mass should be poured out into cakes of from one to ten inches in thickness. They must not be pressed hard. Such a paper, it is said, will adapt itself to the form of the articles, and will serve until completely worn out.

GLYCERINE AS AN ILLUMINANT.—Pure glycerine, it is said, may be burned in lamps, provided the wick is so arranged that it shall not be elevated above the surface of the liquid, as the viscosity of the substance will not permit of its being fed upwards by capillary attraction. The flame of glycerine, like that of alcohol, is almost colorless. Glycerine, however, is easily mixable with a variety of substances that will impart luminosity to the flame, and a number of substances rich in carbon may be added to it for that purpose. It is not improbable that circumstances might arise where these facts would be useful.

TO DETECT STARCH IN SUGAR.—It is said sugar adulterated with starch may be detected by a very simple test. A little pure sugar is taken in the mouth and when dissolved is replaced by a little of the suspected article. If the latter contains starch, glucose or chloride of tin, a distinctly bitter taste will be present.

TO BLUE GUN LOCKS.—Gun locks and revolver barrels, being usually made of steel, are rendered blue by simply being subjected to heat. The articles are first finely polished and then subjected to a uniform heat, gradually applied. This is best done by immersing them in hot ashes or sand, and carefully watching the effect of the heat. As soon as they acquire the right color, they are to be taken out of the sand bath and plunged in oil. The temperature necessary to obtain the color is from 500° to 600° Fahr., the last giving the darkest shade.

TO WHITEN RED NOSES.—Meryl is the name of a secret preparation to bleach red noses. It has been examined, and found to consist of a liquid containing benzoic acid, salicylic acid, and thymol, and a powder composed of oxide of zinc, French chalk, and a trace of carbolic acid. It is evident that the discoverer of meryl thinks the red color of the nose to be due to a beginning of decomposition, since all the aromatic antiseptics enter into the preparation of his nostrum.—*Journal of Chemistry*.

COMPOSITE DIAMONDS.—A diamond expert of Chicago asserts that many of the so-called solitaires, sold as single stones, are made up of small stones cleverly put together. Under the blowpipe they separate. He adds the surprising statement that not one diamond in ten sold in this country is other than the refuse of the London market. Nearly all are off-colored, speckled or feathered, and are sold at a fictitious value.

ROOF VARNISH.—A varnish for roofs has been recently patented in Germany which is composed of 35 parts of clay slate, 30 parts mica slate and 35 parts resin, all finely powdered and heated with 50 parts of tar.—*Boy, Ind. und Gewerbeblatt*.

A NOVEL INDUSTRY.—From saw-dust, ground-up twigs and like materials, pails, tubs, molding for buildings, doors, sashes, blinds, etc., are now manufactured at Great Falls, Windham, Maine.

It is said that some of the sarcophagi of ancient Egypt bear the marks of having been hollowed out with tools of the crown or cylinder-saw order.

GOOD HEALTH.

Dr. Tanner's Fasting Experiment.

Its Lessons and Philosophy.

Of all the exhibitions which have attracted the attention of the people in and around New York City, the forty days' fast of Dr. Tanner is not the least remarkable. If his aim was to draw public attention and be extensively noticed, he has fully attained it, as no daily paper can be taken up which does not contain a full account of his doings and feelings of the last 24 hours, while he is watched by the physicians of the allopathic as well as of the eclectic school, and in addition to this always by a *Herald* reporter, to make sure that there is no deception practiced, as has been so frequently the case with other pretended fasters.

That his experiment is not altogether useless, as is maintained by some, we will try to elucidate, notwithstanding we agree that the sacrifice and danger he exposes himself to appears so great that it is doubtful if they will be compensated for by the physiological and pathological lessons to be learned by it.

His fast has, in the first place, proved the mistake of those who judged all men alike, and reasoned that because a weak, hysterical and ill-fated girl of 18, perhaps consumptive besides, died within two weeks from starvation, as soon as she was carefully watched, therefore nobody could be without food for a period of 40 days, forgetting that the case is quite different where we have a man of between 40 and 50, the age of maximum resistance, a man well fed, of whom the weight is far above the average for his size, and who was provided with a copious layer of adipose tissue around his body, a man who had practiced fasting for sanitary purposes, finding it the best way for him to cure gastric derangements, for which he had a liability, and who had gradually increased the time of fasting until, at his last fast in Minneapolis, he had extended it to 42 days. This was not believed and deception suspected, hence a challenge for \$1,000 if he succeeded when carefully watched. Dr. Tanner accepted, but the challenger backed out under some pretext, and Dr. Tanner, to save his reputation and prove his theory, came on and submits for nothing to the task under the eye of careful watchers.

It must be conceded that few persons would possess such a strong will and determination to persist in subduing all appetite, and disregard the no doubt exceedingly disagreeable and perhaps distressing feelings consequent to total abstinence from food; but Dr. Tanner possesses this determination in the highest degree, and he never thought of cutting the fast short, whatever may sometimes have been the opinion of his watchers.

In order to understand what may be learned from this experiment we will, for the benefit of the non-professional reader, remind him of a few physiological principles.

The chemical constituents of the human body have to be constantly renewed, and the waste has to be supplied by the food. Some of these constituents are wasted rapidly, others slowly,

and in case of starvation the elements rapidly waisting away must be present in the body in sufficient quantity to keep the functions of life in operation. These rapidly wasting constituents may be divided in three classes, those in which carbon prevails, those in which nitrogen, and those in which phosphorus is the prevailing element.

The carbonaceous compounds are wasted in keeping up the animal heat. This is accomplished by a slow combustion, that is, a combination of the carbon with the atmospheric oxygen, which is continually going on in the capillaries through the whole body, the oxygen being furnished by the blood, which absorbs it in the lungs, and which by the arteries is sent through the body. The product of this combustion, the carbonic acid, still absorbed in the blood, is by the veins sent to the lungs, where it is given off and escapes in the act of respiration. After having stripped Dr. Tanner, when he commenced his fast, for the double purpose of ascertaining his physical condition and leave no doubt that he had no food about him, it was seen that he had plenty of fat in and around his body to furnish carbon enough to last him more than forty days.

The second element of rapid consumption is nitrogen; it proceeds from the waste of the muscular tissue, which is always going on, even during sleep, as the heart is a muscle continually contracting, and respiration is kept up by muscular action. The blood takes up this waste in the form of a compound, of which the chemical name is cyanate of ammonia, but which by physiologists is called urea. It is the function of the kidneys to secrete this from the blood, and numerous experiments have settled the nature and amount of this secretion, which in healthy persons consuming food varies from 25 to 35 grams every 24 hours. When Dr. Tanner began his fast it was secreted at the rate of 29 grams, and as the nitrogen in any excess of nutrition is similarly changed and secreted, it was expected that a large reduction would be observed as soon as the fast began to have effect on the system. This expectation was realized, and the amount soon fell off to 23, 20, 17, 16, and finally 13 grams, at which it remained stationary, with slight oscillations beyond. This amount of nitrogenous substance represents, therefore, the waste necessary to sustain the functions of life, and would at once be increased in case food was taken by the experimenter, at least nitrogenized food, such as beef extract or its equivalent, albumen, casein, milk, etc., the only substance which would be of benefit to him. Analytical chemistry, therefore, acts here as a reliable detective, and to the credit of all concerned it must be said that never the least suspicious increase of urea was observed, it remaining very nearly constant, and will no doubt become double and more as soon as after the fast food is again taken.

The third element of rapid waste is the phosphorus; it proceeds chiefly from the waste of the brain and nervous tissues. It is so important in these functions that a great German chemist has formulated the expression, "without phosphorus, no thought." Every mental act and every nervous excitement is accomplished by a consumption of phosphorus, which, combined with different bases in the body, especially soda, magnesia and lime, is secreted by the kidneys as a soluble salt, not only easily detected as crystals by the microscope in the sediment, but even an approximate estimate may be had of its reduction or increase by the number of crystals seen in the field under the same circumstances.

This third element did not at first show any reduction in quantity, but, to the contrary, for a few days some increase. It was at the occasion that Dr. Tanner had been unjustly accused by a physician present that he had surreptitiously accepted food from one of the watchers; this appears to have preyed upon his mind. Attention was therefore called to the danger in this direction, a danger proceeding from the more rapid waste of the nervous system. Relaxation was therefore devised, and daily carriage rides, which eased his mind and were followed by a more sound sleep, soon reduced the phosphates secreted, and at the same time reduced the irritability and temper of the experimenter.

This observation tallies perfectly with what has been observed in the case of such clergymen who have every week the periodical labor of preparing and delivering two sermons on Sunday. Chemical analysis has proved that at that time they secrete more phosphates than in the middle part of the week, after the rest of Monday and Tuesday.

We will only add that the suspicions occasionally expressed by those who cannot realize the possibility of so long a fast are utterly unfounded. All those who have taken the trouble to watch long enough, especially if they became acquainted with Dr. Tanner, came to the conviction that he is too high-minded, upright and honest to deceive any one with so mean a device as to take food secretly; while in regard to the responsibility of the watchers, it must be considered that Dr. Tanner can any time obtain what he wants. If he asked, for instance, for a beef-steak it would be procured at once, but this of course would end the watch, being the close of the experiment.

He told us that some years ago he was married, but became disgusted with his wife, who, he says, continually stuffed her stomach with all kinds of food. He could not stand this, and when remonstrance did not improve her he obtained a divorce.—*Scientific American*.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, Aug. 28, 1880.

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The Week.

Since our last issue news has been received from the Government yacht *Freda*, which was dispatched to Socorro island, in the hope of finding and rescuing the ill-fated captain and party of the *Mathilde*. Capt. Yates has written from Mazatlan that he had discovered no traces of the missing boat's crew, after a thorough search. As we write the news comes to us of the return to this port of the *Lancashire Witch*, with the report that she also failed to discover the missing boat of the *Mathilde*.

The Industrial exhibition continues to be the pleasant and interesting feature of the city. Since the various exhibits have been placed in form, the interest of the public in town and country has greatly increased, and the daily concourse is large and gratifying to both the exhibitors and the managers. For the especial benefit of our readers in the country, we think it worth while to mention thus far in advance of the time, that arrangements have been made for a visit to the fair by President Hayes and General Sherman and party on the afternoon of the 8th of September. It is safe to predict that there will be an immense throng on the occasion.

Advices from Europe received in this city on the 25th inst. represents the home supply of wheat in both England and France as larger than it has been for a number of years, and further, that the demand for American wheat will be less than it was last year. As our wheat crop is enormous, the market for the heavy surplus will probably not be as brisk as usual. Well, full granaries nerve one to face the vicissitudes of a year.

We get the most satisfactory news from the mining regions of the State. It is the beginning of the cleaning-up season at the placer and gravel claims; several companies have already done so with fine results; and the finish of the business will show a large product of gold. On the Comstock, just now, the most interesting operations are progressing in the mines at the north end of the great vein; the results of which may put several of them in bonanza. The prospect is highly encouraging.

Color-Blindness.

The knowledge of color-blindness has become developed to the extent that it enters into the practical business of life; for in one State (Connecticut), at least, it governs the retention and choice of the men employed on the railroads. Lately, William Pole, an English amateur in science, and himself a victim of color-blindness, has written a paper on the subject, which embraces all that is known about it. He shows just what the color-blind see. The affection is confined almost exclusively to men, although instances of it have been known in women. It is estimated that about 1 in every 25 men is defective in color perception. The peculiarity is assumed to be hereditary and of great antiquity, although it is only within a century that it has been definitely described.

A poor English shoemaker, named Harris, was the first to notice the defect in himself and to suspect its existence in others. His case was the subject of a paper read before the Royal Society in 1757. It was reserved, however, for the distinguished English chemist, John Dalton—author of the "New System of Chemical Philosophy," in the first volume of which he explained his atomic theory—to elaborate and generalize the facts of color-blindness. Dalton was nearly 30 years of age before he noticed his defective vision, for one day while comparing his impression of the color of a flower with that of his friends, he became convinced of his visual peculiarity, and was led into its investigation. The result was the first distinct setting forth of the difference between the color-blind and people of normal sight. Sir John Herschel, who became interested in Dalton's case, set him to matching various tinted skeins of silk, the result of which clearly revealed that the color-sense was lacking.

Mr. Pole was also, like Dalton, about 30 years old before he was conscious of his defective vision, and his investigations show that color-blindness presents similar general characteristics in all its subjects. He says that, "strictly speaking, Daltonism (the name sometimes given to color-blindness) has only two color impressions—yellow and blue; yet the sensations of one color-blind give him, 1, pure white; 2, pure black; 3, infinite varieties of gray; 4, yellow in a great variety of intensities; 5, combinations of these with the varieties of gray; 6, blue in a variety of intensities; and 7, combinations of these with the varieties of gray." Such color sensations as red, green, orange, violet and all their combinations are unknown to the color-blind. Still, these colors make upon him distinct impressions. Red, for instance, appears dark yellow or yellow brown; pink or crimson seems simply gray or a dark blue. Green is more perplexing: yellowgreens, such as predominate in nature, appear as a combination of gray and yellow; neutral greens, varieties of gray; and blue greens, combinations of blue and gray. Violet appears a dark or shaded blue, and brown a mingling of yellow or gray. Mr. Pole is convinced that genuine color-blindness is past remedy. It is a constitutional defect, and is generally hereditary. There are still conflicting theories respecting this visual defect, and it is an open subject of investigation.

Considering the disadvantages of the color-blind in following many pursuits, Mr. Pole says it is remarkable how well they have got along. Dalton became famous in chemistry, a science in which color is one of the important elements of observation; and Mr. Pole himself succeeded as a draughtsman and colorist of drawings. His remarks on color-blindness in those employed on railroads are highly interesting. He says:

"Most people know that red and green lamps are used at railway junctions, the former to stop a train, the latter to allow it to pass on; and at sea the use of red and green lights on the two sides of a vessel indicates to other ships the way she is going, in order to avoid collisions. Now, as one of the most common symptoms of color-blindness is the confounding, under certain circumstances, of red with green, it is taken for granted that a color-blind engine-driver or helmsman must be unable to distinguish between the contradictory signals, and frightful pictures are drawn of the danger that the public are constantly incurring. But what says the inexorable logic of facts? In this country we have not only had a tolerable experience of the working of railways for half a century, but we have gathered a mass of information about railway accidents which is unknown elsewhere. Every casualty that occurs in the three kingdoms is carefully inquired into by a government board, and a report is published as to its causes; and yet, so far as I know, never, in a single instance, since railways have been in use, has an accident been traced to the mistaking of a red for a green night signal. And when we consider that, according to the statistics, about one in every 25 engine-drivers must have been color-blind, it follows that, if the notions of the alarmists had been true, numbers of collisions would have occurred every day—in fact, that the traffic of the country could not have gone on. The truth is, the agitation has arisen from the difficulty the normal-eyed investigators have in understanding exactly what we, the color-blind, really see. We could tell them that although the red and green lights do not give us

the true red and green sensations, yet still they are strongly contrasted to us, and we are in no danger of mistaking one for the other. On the whole, then, I think the alarm on this subject is unnecessarily magnified; but at the same time I do not deny a possibility of danger under certain circumstances, and I would by no means discourage reasonable precautions in the selection of men."

Chromic Iron.

The following letter from the State Mineralogist, answering certain inquiries of the County Surveyor of San Luis Obispo, we copy from the *Tribune*:

CAL. STATE MINING BUREAU,
Office of State Mineralogist,
San Francisco, Aug. 7, 1880.

MR. EZRA CARPENTER—Dear Sir: In your letter of July 13th, you ask for information as to the cost of erecting works for the reduction of chromic iron. The treatment of chromic iron is briefly as follows:

First, the ore is very finely pulverized, sifted, or holed, and placed on a reverberatory furnace with salts of potash and the heat continued until the chromic ore is decomposed, and the chromic acid combines with the alkali forming crude bichromate of potash. This is raked from the furnace on a brick floor, and when cold is leached with water in a suitable tank, which extracts the soluble bichromate of potash and from which all the chrome products are obtained.

You will see that its manufacture depends on a supply of potash which cannot be obtained on this coast and must be imported. This would probably be fatal to its manufacture here. Other alkalies, such as soda or lime, might be substituted for the potash, but the only gain in that case would be the concentration, as it would nearly all have to seek a market elsewhere.

It is my opinion that if the manufacture of chromic products should be undertaken, the first works should be small and experimental, otherwise great loss of money would result, even should success eventually follow.

Chromic oxide is largely used by the Government in printing greenbacks. This might be manufactured to advantage, as might also be the chrome yellow and the chrome green used on the Pacific coast for paints. But any manufacture should be undertaken with the understanding that the market is limited.

Chromic iron is also used in the manufacture of a hard alloy with iron, which for some purposes takes the place of steel. For this purpose it could not be at present utilized here.

Very truly, etc.,
HENRY G. HANKS,
State Mineralogist.

SOLID SILVER IN NEW MEXICO.—A correspondent of the *Denver Tribune*, writing from Silver City, Grant county, N. M., gives this slight sketch of a successful miner's history. It has all the charm of a romance. About 12 years ago, says the writer, W. Breemen, the newly-elected Mayor of Silver City, came to Grant county with a small sawmill. There was no Silver City then, not even silver. He sawed the first lumber for the town, and afterwards commenced to mine, and to-day he has an extensive mill in full tide of operation. He is the owner of the "76" and "Breemen," in Chloride Flats, one and one-half miles distant from his mill. In his office I found the finest cabinet in the Territory, by all odds. In fact the mineral contained therein is worth more dollars than any dump in New Mexico. I confess that I was surprised on examining the rich silver specimens contained therein. I saw silver that is just as near pure as a mine can turn out. I was taken to a room where at least 10 tons were stacked, all of the same being so pure that a stamp mill would fail to crush it. At his mines he has plenty of the same sort. Recently a blast at "76" developed a chimney that his foreman knows not the depth of, and I was told that silver almost pure showed itself in increased quantities. Those who know say there are \$1,000,000 in sight. He has had offers repeatedly for the mine, but he does not want to sell. He is merely taking out enough ore each day to supply his mill in the city.

BLACK DIAMOND COAL MINE.—This property appears to be in fine and prosperous condition. The works at Nortonville were visited recently by the editor of the *Antioch Ledger*, who furnishes some interesting details of the company's operations. He says: The apparatus at the mines is in a high state of perfection. During our visit, between the hours of 1 and 4 o'clock P. M., on Saturday last, there were hoisted from the main shaft 212 cars of coal, containing each one ton, besides 200 men and boys and twelve horses, the men and horses, as we were informed, being equal to about 32 cars of coal. Mr. Morgan informed us that between 500 and 600 tons of coal would be taken out of the mine that day, for which a ready market is found, as was shown by the bunkers, which were, at the time of our visit, nearly empty. Some 8 or 10 boys and men were engaged in screening, and nothing but pure coal was allowed to pass into the bunkers. Probably there is no coal mine on the coast which has such extensive machinery and complete arrangements for work. To those who have never examined anything of the kind, it is well worth a trip to Nortonville.

Lixiviation of Gold and Silver.

The following extract from a coming work on this subject, by Charles H. Aaron, will be of interest. Speaking of the point at which the leaching of the chloridized gold begins, the author says: At this point arises a difficulty from the fact that a large quantity of chlorine remains in the vat, the escape of which into the leaching room is not desirable. If the cover of the vat be raised the gas is visible like a green ssa above the ore; a pestilential ssa whose waves, surging forth upon the slightest disturbance of the air, threaten to envelop and suffocate the workman, unless he hold his breath while boistering the cover and fastening the tackle, and then retreat in haste till the storm is over; and even then the same troubles recur while water enters and displaces the chlorine still remaining beneath the filter and permeating the loose mass of damp ore.

To overcome this difficulty some operators fill the vat with water before lifting the cover, and, by means of a rubber hose, convey the expelled gas either out of doors or into another vat charged with ore. There are two objections to this plan—firstly, a great deal of chlorine is absorbed by the water which has an unfavorable effect in the precipitation of gold, making it more difficult to settle, as well as wasting the precipitant; and, secondly, the water entering the tub in one large stream descends through the bed of ore at one point, and rises through it in other parts, a solution of nearly uniform strength throughout the mass, and requiring a large quantity of water to complete the leaching, taking more time and giving finally a weaker solution than is necessary for the precipitation, which takes place better when the solution is strong.

The proper way to apply the water is by spraying it all over the surface of the ore in the vat so that, percolating downward through the mass, it carries the greater part of the gold chloride in the first portion of the water, and a rich solution is got at once, while less water is required to remove the whole of the gold, and the stronger solution thus finally obtained gives a better precipitation on addition of iron sulphate.

But if the spraying is undertaken by hand with a sprinkler, the loose ore, settling as it becomes wet, expels chlorine in such volumes as render it impossible for a man to stand near the vat.

The course I adopted was to place a coil of lead or rubber pipe, perforated by many small holes, around the vat under the cover. After raising the cover the water supply pipe was connected with the perforated coil, and the water, under moderate pressure, issued in a number of fine jets, and showered all over the ore, through which it descended gradually, dissolving the gold chloride as it passed, so that the first solution that passed through the filter and filled the space under it was very rich, while that which finally remained on the top was very weak. The discharge was then started, and the water thenceforth admitted in the usual way, keeping the surface of the ore covered until the leaching was finished.

This plan, however, is still open to the objection that it gives a solution containing much free chlorine, while the chlorine which is expelled is not removed from the room, whence it is very desirable that means should be used to abstract the surplus from the vat before raising the cover or admitting water; and the appliance I am about to describe will not only do this, but will also save the chlorine for use in another charge of ore with little waste.

Before lifting the cover, the plug-hole being open, one of the lower openings, either the nipple through which the gas was admitted or the discharge pipe, is connected by a rubber hose with the interior of an inverted bell of sufficient size, which is immersed in a tank of water, precisely like the "gasometer" of gasworks, and like it, counterpoised and suspended by rope or chains passing over rollers, so as to allow the bell to rise or fall in its water tank.

By adding to the counterpoise weights, the bell is gradually raised, and the chlorine is withdrawn from the vat and enters the bell, while air entering the vat through the open plug-hole in the cover replaces the abstracted chlorine. The filling of the vat with water is then proceeded with in any way that may be convenient, without annoyance from escaping chlorine.

The chlorine in the bell may be again expelled when wanted, and caused to enter the same or another vat, by simply removing a part of the counterpoise and allowing the bell to descend by its own weight.

A SUGGESTIVE POCKET.—The late find by a miner, while making his final clean-up below Indian flat, of a pocket of nuggets valued at \$1,300, suggests to the Nevada City *Transcript* the inquiry, where did they come from? The nuggets, weighing from six ounces down to half a pennyweight, were found to have been at one time under a very heavy pressure, as though placed between two rocks and mashed flat. It has been suggested that probably there is an ancient channel in the bill above the claims, and it is altogether probable that a company will be formed, and a tunnel run for the purpose of testing the theory advanced.

The Women and Silk Culture.

From east to west the women seem to have laid bold upon the problem of silk culture with a vigor and earnestness which cannot fail. There is something eminently proper in women assuming charge of the production of silk, and when home-made silk dresses appear upon our streets, the wailers of the good old times of the spinning wheel and home-spun will be silenced. It might be a fine thing for the wife of the President of the United States, to offer a prize for the first silk dress produced from worm to flounce by the wearer thereof.

They have in Oakland a Woman's Social Science Association, one of the favorite themes of which is silk culture. A year or more ago the subject was under consideration, and last week it was attacked again and much interest elicited. It seems that woman was the pioneer in silk growing, for the essayist at the Oakland meeting, Mrs. J. H. Smyth, cited the fact. A woman, an empress, actuated by the noblest sentiment—love for her husband and his subjects—was the first to discover and utilize the labors of the silkworm. The Emperor Hoang-ti, who lived 2,600 B. C., was desirous that his legitimate wife, Si-ling-chi, should contribute to the happiness and prosperity of his people; therefore he charged her to study the habits of the silkworm and to try to utilize its threads. Animated by the noblest impulses, she caused great quantities of them to be collected together, in order to make herself familiar with every detail while feeding and tending them. By so doing she not only discovered the means of successfully rearing the larvæ, but still further, the manner of winding the silk from the cocoons, and of employing it in the manufacture of fabrics. It is through gratitude for so great a benefit, says the historian, that posterity has deified this noble woman and rendered her particular honors under the name of the Goddess of Silkworms. Up to the time of this empress the Chinese clothed themselves with the skins of animals, but after her great discovery they applied themselves to the manufacture of cloth. The Oakland ladies propose to emulate this illustrious example, and continue the discussion of silk culture until some practical results ensue. At an early date an essay will be read by Mrs. T. H. Hittell, of this city, who is an earnest advocate of the introduction of the industry as a household labor.

Inasmuch as the subject is being thus promoted in this State, we propose to state what other ladies are doing in the same direction in Philadelphia. Some time ago we alluded to the formation of "Women's Silk Culture Association" in that city. We have just received the reports of the first season's work of the society, from which we take leading items. The managers give assurance that they have tested the practicability of raising the silk worm within the city of Philadelphia, have found the task fully as difficult as was expected, and have attained results quite equal to their anticipations. They have located a great many mulberry trees around the western parts of the city, and have found what their yield in leaves is likely to be in the future, also, what the expense in time and money required to bring them to the society. They have raised the cocoons, the moths and the eggs in efficient abundance to proceed to the next step—the reeling—whenever a reel sufficiently light, cheap and easy-working shall be obtained. They have instructed a class of scholars in the art of raising the silk worms. These have been taught through the instrumentality of notes dictated by the superintendent and taken down by each scholar. They have developed a widely-extended interest in the culture of silk, and have gathered up and concentrated the products of widely-separated districts of the country. They have cocoons from Alabama and Florida, and splendid specimens, produced by careful feeding, in Delaware; also from New Jersey and Pennsylvania. A lady, stimulated by the example set last year, has raised a large crop at Chadd's Ford, and another has just produced a quantity of fine cocoons at the Permanent Exhibition Building. A lady of fortune, at Kennett's Square, has raised a large number also, and individuals all around, at Holmesburg, Bridesburg, West Philadelphia, in Bucks county have been in-

cited by this "women's" movement to try a hand at silk raising. They have sold silk worms and eggs to parties all around the city. The farmers are beginning to interest themselves about it, and are utilizing their spare beds and their wild mulberries as never before. They begin to see that mulberry leaves may become a marketable article, and that their boys and girls may use their idle time and talents with benefit to all. It is the expectation of the society that the country people will establish similar schools of instruction in many parts of Pennsylvania, under the same charter which provides for "branches" everywhere. Perhaps the silk reformers of Oakland may ere long undertake a practical promotion of the subject after the Philadelphia style.

ENGLISH AND AMERICAN RAILROADS.—The contrast between the British and American system of railroads is very remarkable. The mileage of the former is only 17,696 miles, the latter 86,497. The cost of the former is \$3,585,000,000, double our funded national debt and close upon the total of the English debt. The cost of our system in operation to December 31, 1879, is placed by Mr. Poor at \$4,416,000,000 on 84,232 miles, or \$4,919,000,000 on the whole system of 86,497 miles. The difference in the average cost per mile is very great—in Great Britain, \$202,000 per mile; in the United States, \$50,000 average per mile. The gross earnings, on the other hand, are directly reversed. The British lines, on 17,696 miles, last year took in \$308,000,000. The lines of the United States, on 84,232 in full operation last year, took in \$529,000,000. The propor-

Too MANY IRONS IN THE FIRE.—A certain facile and flighty inventor got this quaint notice from the Rochester (N. Y.) Herald: Edison begins to think about a flying machine. He will soon have one, no doubt, almost completed, lacking only the finishing touches for complete success at his wonderful laboratory in Menlo Park. All he is waiting for now is the suggestion which will ensure success. Edison's collection of unfinished machines and devices is a large one. There is the phonograph, the electric light, the electric engine, and soon we shall have the flying machine. In the meantime he may perhaps some day come across a quaint scriptural passage which reads as follows: "Ephraim is a cask not turned." Perhaps that will suggest something.

AN ÆSTHETIC DEVOTE.—This portrait of an æsthetic devotee is drawn by London Truth: Her dress is semi-Greek. Her hair is fillet-bound in front, and falls on her neck like a little wisp of hay. Her chin is well in the air, and her haggard eyes are fixed on a vase of lilies. Her arms are quite the longest, and almost the thinnest, I have ever seen, but she makes great play with them in expressing her woeful thoughts. As I watch her with deep and pure enjoyment I recall a short simple anecdote of the lady which was told me not long since. She was walking in her garden with one she deemed a kindred spirit. The lunch bell rang. The kindred spirit, after a few minutes' delay, and aware that lunch outlets are better hot than cold, ventured to suggest a move to the dining-room. The lady said, with one of her sweetest,

The Forest Area of the United States.

As we have heretofore noted, the subject of our forest wealth and the influences affecting it will occupy one of the series of valuable reports upon industrial topics which will accompany the volumes of the census of 1880. The investigators are now upon this coast making a thorough study of trees and of forests. The census of 1870 disclosed some very interesting facts concerning our forest area, but that of 1880 will be expected to be much more comprehensive, definite in detail and accurate than the last attempt made by the enumerators. It will be some time before the results of the new examination can be set forth; but as interest has generally been awakened by the appearance, here and there, of Prof. Sargent and his colleagues, we recur to the deductions from the last census as likely to give information which will be of value to those who now find themselves drawn to a consideration of our forest areas.

The report of the United States Department of Agriculture for 1875 contains some valuable deductions made from the census of 1870 by J. R. Dodge, at that time statistician of the department.

The accompanying diagram will illustrate the proportion of forest area of farm lands in the several States—the figures in the white portion of the squares representing the farm-area in acres, and those in the shaded portion the proportion of that area in forest, in each State respectively. In some of the States the farm lands comprise nearly the entire area, exclusive of lakes and streams; in others, those more recently settled, and

also some of the original 13, the unoccupied or wild lands constitute a considerable proportion of the whole area. Thus Maine has 5,835,058 acres in farms, while her area includes 22,400,000 acres of land and water. In estimating the proportion in wood land, the water surface on lakes and streams, the prairie, the ledges and other wastes incapable of producing trees, must be taken into consideration. After canvassing the facts affecting this proportion in the several States of the area exclusive of farms, one-half was assumed to be in forest in Maine, New Hampshire, Vermont, Pennsylvania, Maryland, Kentucky, Missouri, Michigan, Florida; six-tenths were taken for Arkansas, Virginia, West Virginia and Louisiana; seven-tenths for North Carolina, South Carolina, Georgia, Alabama, Mississippi and

Maine.	New Hampshire.	Vermont.	Massachusetts.	Rhode Island.	Connecticut.	New York.	New Jersey.	Pennsylvania.
5,835,058	3,605,994	4,528,804	2,730,283	502,308	2,364,418	22,180,810	2,989,511	17,994,209
2,224,740	1,047,090	1,386,934	706,714	169,399	577,333	5,679,870	718,335	5,740,864
Delaware.	Maryland.	Virginia.	North Carolina.	South Carolina.	Georgia.	Florida.	Alabama.	Mississippi.
1,052,322	4,512,579	18,145,911	19,835,410	12,105,280	23,647,341	2,373,541	15,961,178	13,121,113
295,162	1,435,988	8,294,734	12,026,894	6,443,851	12,928,084	1,425,786	8,380,332	7,559,384
Louisiana.	Texas.	Arkansas.	Tennessee.	West Virginia.	Kentucky.	Ohio.	Michigan.	Indiana.
7,025,817	18,336,523	7,597,296	19,581,214	8,528,394	18,660,106	21,712,420	10,019,142	18,119,648
4,003,170	7,662,294	3,910,325	10,771,396	4,364,405	9,124,658	6,883,575	4,080,146	7,183,334
Illinois.	Wisconsin.	Minnesota.	Iowa.	Missouri.	Kansas.	Nebraska.	California.	Oregon.
25,882,861	11,715,321	6,493,828	15,541,793	21,707,220	5,656,879	2,073,781	11,427,105	2,383,252
5,061,573	3,437,442	1,336,299	2,524,793	8,965,229	635,419	219,324	477,146	761,001

DIAGRAM SHOWING THE FOREST AREA OF THE UNITED STATES AS COMPARED WITH THE CULTIVATED AREA.

tion of passengers to freight on the former is greater than in this country, though only 52% of the whole earnings. The operating expenses in Great Britain average 52%; in the United States, 58.40%.—Springfield Republican.

FARM LABOR AND WAGES.—Colonel Worthington, the statistician of the agricultural department, has finished his annual report on farm labor and wages, from which a number of interesting facts given below are gathered by the Tribune: The table giving the average of wages of farm laborers, with and without board, as compared with the wages paid in several branches of skilled mechanical labor, was compiled from returns made to the department last April, from which it is learned that in the Pacific and mining States and Territories, the range of monthly wages for farm laborers without board is between \$30.75 in Montana and \$22.50 in Washington Territory. Of the States east of the Mississippi, Minnesota pays her farm laborers better than any other northern State, the monthly wages with board being \$16.33, while Vermont pays only \$12.62. In the Southern States the prices paid range from \$12.26 in Louisiana to \$7.32 in South Carolina, the average being \$9.60.

BUILDING THE DAM.—We learn from the Marysville Appeal that the work of building the dam on the Yuba river has commenced. The workmen seem to have come from the four quarters. It is estimated that there will be work for 500 men for weeks to come, and although this is the busy season, it is believed that enough men can be obtained for the work. No Chinese will be employed in any capacity. The contractors expect to pay the laborers \$40 a month and board.

EARTHQUAKE IN CUBA.—A slight earthquake occurred August 20, at Mariel, twenty miles west of Havana, lasting for three seconds. The oscillations were from northeast to southwest.

saddest smiles: "I have already lunched. I have eaten half a rose. I have kept the other half for my supper."

VITALITY OF A NEWSPAPER ITEM.—A remarkable instance of the vitality of a newspaper item is given by the Christian Advocate. That journal says: A good many years ago the late Rev. John Milton Holmes, a young minister of Jersey City, preached the eighth anniversary sermon of his installation over a Congregational church. In some way it started as the eightieth anniversary sermon, and traveled all over the United States and Europe. The contradiction went lazily after it, and after awhile it died out. But four years later it sprang up again, with editorial comments, in an English paper, and after having a run there came over to this country, where it was finally killed. Meanwhile Mr. Holmes died, being about 40 years old.

A CURIOUS INCIDENT.—Mrs. Cannon, wife of Mr. Will Cannon, of Robinsonville, Tex., was on her way home from church on horseback, one evening lately, when she felt something stick her in the face, and supposing it to be a limb of a tree, threw up her hand to ward it off. While undressing for bed after her arrival home, she was horrified to find a rattlesnake in the sleeve of her dress. The reptile dropped out on the floor and was killed. The lady had not previously felt much inconvenience from the slight abrasion on her face, but it now commenced swelling, and became so painful that a physician was called in to attend her. It is supposed the snake had taken refuge in the tree, and that it hit her and transferred itself to her sleeve as she rode under it.

OPPORTUNISME is a new word in French politics just now. Rochefort and his party are opposed to opportunisme, to which dreadful quality they claim that Gambetta is a slave.

Tennessee; one-third was taken for Massachusetts, New York and New Jersey; one-fourth for Texas and Oregon; one-sixth for Wisconsin and Minnesota; one-eighth for Iowa; one-tenth for Rhode Island, Connecticut, Ohio, Indiana and Illinois; one-twelfth for California; one-twentieth for Kansas, Nebraska and Nevada.

Taking into consideration only the farm lands, the proportion of wood lands is smallest in California, being 4.1%. In order, respectively, follow Nevada, 6.4%; Nebraska, 10.2%; Kansas, 11.2%; Iowa, 16.2%; Illinois, 19.6%. The proportion increases, State by State, from the Pacific coast eastward to Indiana (39.6%), and then comes the devastation of the ax, which reduces the percentage of Ohio, a region originally forest, with the exception of small patches of prairie mainly about the headwaters of the Miami, to 31.7%. Pennsylvania has about the same proportion, or 31.9%, and New Jersey 24%.

There are only two other Western States that have percentages between 20 and 30, viz.: Minnesota, 20.6; Wisconsin, 29.3. The Eastern States (besides New Jersey) which come within the same limits are: Connecticut, 24.4; New York, 25.5; Massachusetts, 25.8; Delaware, 28; New Hampshire, 29; Vermont, 30.6. Those having between 30% and 40% of this farm area in forest are: Pennsylvania, Indiana, named above; Oregon, 31.8; Maryland, 31.8; Rhode Island, 33.7; Maine, 38.1. The States having between four and five-tenths of their farm lands in forest are three—Michigan 40.7%; Texas (the eastern portion generally wooded), 41.6%; Virginia, 45.7%. The southerly belt is the most heavily wooded portion of the country, all the States, with the exception of Virginia and Texas, having more than half of their farm-areas in wood land, and a larger portion still if the wooded wild lands should be counted in with the farm lands. The proportion in the occupied or farm areas is as follows: West Virginia, 51.1%; Arkansas, 51.4%; South Carolina, 53.2%; Georgia, 54.6%; Tennessee, 55%; Alabama, 56%; Florida, 60%; North Carolina and Mississippi, 60.6%.

Fairs and Industrial Exhibitions.

Fairs and industrial exhibitions were born of trades. The thought of exhibiting at some central locality the handiwork of a State, a nation, or of a number of nations, is coeval with the birth and growth of trade and exchange. The Olympic games of the Greeks may perhaps be considered the embryo of national fairs. In the St. Dennis fair, established in the seventh century of our era in that ancient manufacturing suburb of Paris, we may recognize the origin of world's fairs. From that time until the present, especially throughout all the centers of exchange in Central and Southern Europe, fairs have been held at more or less frequent intervals, exhibiting and revealing to man the growing genius of the world and pointing out to him the true road to comfort, to happiness and to prosperity, through the labor and genius of the mechanic, the artisan and the manufacturer. The fairs of the Middle Ages were largely instrumental in redeeming the world from the darkness of ignorance, and in establishing a general desire among the various classes of craftsmen to improve in skill and knowledge, and to advance the masses to a higher plane of human brotherhood and dignity.

But the most wonderful development connected with fairs has been made since the introduction of the steam engine and railroad. With the few roads of the early ages, and those but poorly constructed and kept, there was great difficulty in exchanging commodities among nations, except by water; while with hand labor alone the great cost of manufactured goods prevented any very large introduction of even the simplest articles for general use. The steam engine and the railroad having brought the extreme parts of individual countries and the various nations themselves into close proximity, and so greatly reduced the cost of all kinds of manufactures as to put them within easy reach of almost every family—the result has been a most wonderful degree of activity in manufactures, and such a sharp competition, that annual fairs and exhibitions have been largely changed from the commercial character which they had previously held, to schools for industrial observation and study, whereby the skill of one section or county is most readily gained by all others.

The modern industrial fair has become one of the greatest moral forces that ever impelled humanity in its rightful career of progress. "By generalizing the best methods of production they have increased the efficiency of human labor in every direction. By affording suggestions to inventive minds they have been instrumental in originating new methods, new tools, new machines and new uses of materials or implements already known. * * * By disseminating more broadly the knowledge necessary to an extensive trade they have given to capital a more secure basis of investment, to labor a more constant field of employment, and to commerce a more direct line of enterprise. Finding a world divided into nations, they have already done much to unite all nations into one world."

In no other way than by this grand mode of object-teaching could such new and extensive fields of practical action have been opened up to the human mind as have been improved during the last half century. These exhibitions have developed among the masses a spirit of investigation which has led to a greater degree of material progress within that time than had been accomplished during the previous thousand years. While the more favored intellects have been led into higher and scientific attainments, which have eclipsed all previous advances into the hidden mysteries of nature, the more ordinary ones have come to such a full understanding of the laws of mechanics, and have so developed artistic tastes, that the march of progress in this direction has manifested itself by a multiplicity of inventions and productions unprecedented in number and variety. A community of interest and thought has grown out of these industrial efforts, which has pervaded the whole civilized world, checked the conflict of national conquest and rendered the wars of the present generation the last convulsions of a pernicious system of military ambition, which is destined to give way before the all-conquering arts of peace. Industrial fairs constitute not only the greatest moral force which ever impelled humanity to progress; but their ultimate and legitimate mission is to bring about the desire of all nations—a final unity of mankind in one great industrial brotherhood, in which labor shall find ample remuneration in a constant field of employment, and capital a secure investment from the senseless clamor of idle and disturbing agrarianism.

PROPER SIZE OF HOUSE SEWERS.—An interesting series of observations has been made by Sewer Commissioner Moore, of St. Louis, to determine the necessary size of sewers to carry off house sewage exclusively, irrespective of surface drainage or storm water. The present sewerage system of St. Louis provides for all the drainage from whatsoever cause; but it has been found expedient, looking towards immediate extension, to arrange certain additions to the system for the purpose of conveying house drainage alone. A certain neighborhood was selected, through which Compton avenue sewer, with a diameter of 7½ feet, passes. On this area of 440 acres were 1,370 houses, population, 11,000. The observations were taken by con-

structing a small dam, with a section of 12-inch pipe running through it on the bottom of the sewer. All the flow in this sewer was made to pass through the small pipe, and it was found that in the middle of this day when the flow is highest, as a rule, the water was only 6½ inches deep in the small pipe. The weather and soil were dry enough to insure that nothing but the waste from the dwellings passed into the sewer. Another sewer was tried, 3½ by 4½ ft., in a fairly built up neighborhood of 155 acres, with the result that a pipe 9 inches in diameter gave a maximum depth of flow of 6½ inches, and a minimum of 4½ inches, giving an average of, say, 5½ inches. While the quantity of the flow seems small, it, however, indicates a consumption equal to about 80 gallons of water per day for every man, woman and child.—*Plumber and Sanitary Engineer.*

Electricity and Railways.

The world has been gazing toward Menlo Park, wondering if Mr. Edison is to solve this problem of moving railway trains by electricity, when suddenly it is discovered that a young inventor has been at work who has obtained patents for an electric motor which antedates any similar patents obtained or solicited by Mr. Edison. It will be a matter of much interest to the public to know that the young inventor, Mr. Stephen Dudley Field, is a nephew of the man who has placed the civilized world under perpetual obligations for his invention of the submarine telegraph. Having given mankind one of the most marvelous appliances of electricity, it must be peculiarly gratifying to Mr. Cyrus W. Field to discover that the son of his brother is likely to introduce the electric current to still other important uses.

If electricity can be made to take the place of steam upon railways, its introduction to such a use will undoubtedly be one of the most important inventions of the age. The discomforts of railway travel will be greatly reduced, while its safety will be increased. These facts awaken a profound public interest in the attempts of inventors to produce a substitute for the steam locomotive. The escape from the dust, the smoke, the heat and the noise of the ordinary locomotive, will make railway travel pleasant instead of irksome, and the impossibility of a collision of trains propelled by Mr. Field's electric motor will remove terror from the minds of the timid mortals who never take a train without apprehension of a disaster. But the economy of the new motor is what recommends it to the immediate attention of railway managers. If electricity can be used at all for the propulsion of railway trains, its cheapness will greatly enlarge the profits of railways. Requiring no fuel or oil, the cost of the electric motor will be far less than that of the complicated locomotive now in use, and its weight will be so moderate that the wear and tear to tracks will be only a fraction of that caused by the ponderous machine by which all trains are now propelled. If introduced, electric motive power may result in a cheapness of transportation which will effect results of great magnitude in commerce, giving the nation an unexpected advantage in the transportation of its products to supply the markets of the world.

However incredulous the public may be as to the possibility of moving the heavy freight trains of surface roads by electricity, it must be confessed that the introduction of an electric motor upon our elevated railways seems feasible, and nowhere else is there such a demand for a substitute for the heavy, dripping, smoking, dirty, noisy steam locomotive. The owners of the elevated railways will be eager to save the \$500,000 or more annually the introduction of the electric motor promises, but they will also take pleasure in promoting the comfort and safety of their patrons by adopting the invention as soon as its utility is demonstrated. It is a matter for congratulation that they are disposed to immediately give Mr. Field's electric motor a full and complete trial.—*N. Y. Mail.*

THE PORT OF GUAYMAS.—This coming rival of San Francisco is thus described by a correspondent of the Prescott (Arizona) *Miner*: The port of Guaymas is situated on the eastern side of the Gulf of California (called on Spanish maps by its original name of the Gulf or Sea of Cortez). The harbor is safe at all seasons, and will accommodate vessels of all sizes; those of deepest draft lie in the outer anchorage; small coasters come in near the Custom House wharf. The population is about 5,000. The commerce consists of the import of foreign dry goods, groceries, hardware, machinery, lumber, wine and spirits, from San Francisco and Europe, and the export of hides and treasure to San Francisco. The traffic coastwise consists principally of the export of flour to southern ports and the import of coffee, sugar, etc., from the south. The vicinity of Guaymas is sterile. Water is at present supplied by water carts, which are filled at wells on the outskirts of the town. A project is entertained of bringing a supply in pipes from the Rancho of San Jose de Guaymas, about nine miles from here, the necessary surveys and plans for which are now being made. The climate is very hot in summer, and in winter cool, without frost in the southern part of the State. The rainfall is very low on the coast, but much more abundant in the agricultural districts. Guaymas is very healthy, the death-rate being exceptionally small.

Encouraging.

At a meeting of the American Bankers' Association in Saratoga on the 11th inst., George R. Gibson, of California, in his address, after reviewing the growth and prospects of the railroads of the Pacific Coast, concluded as follows: In California the internal industries are generally prosperous and productive, and the wheat crop this year will be unprecedented. Last year the Pacific States closely approximated Russia in its export to Great Britain, and this year they will far exceed it. The acreage is 20 per cent. above the average, and present appearances indicate that California alone will yield 50,000,000 bushels, requiring a wheat fleet of 350 vessels to move the surplus. When California wheat was first introduced into the foreign markets it commanded two shillings per quarter more than any other wheat, but negligence in harvesting and shipping has reversed this premium, and it now brings about two shillings less. This has been observed by the Produce Exchange, which will endeavor to remedy the defect which involves an annual loss of \$3,000,000 to the farmers of the State. The revenue from its fields, forests, herds, fisheries, orchards, shipping, gold, silver and quick-silver mines is a direct creation of wealth, and must serve to continually enrich its energetic population. Business stagnation, which is of periodic occurrence in all commercial countries, and pernicious legislation, may temporarily impede, but cannot defeat the splendid destiny of that Empire by the western sea, with its unrivalled resources of soil and mines, its genial climate and commanding position at the gateway of Asiatic commerce.

PETROLEUM IN ITALY.—In a letter published in the *Pungolo*, attention is called to the existence of petroleum in the Province of Basilicata. It is by no means a recent discovery, for the writer himself says that when he was at Marsiconovo, 40 years ago, examining the asphalt which was found there in abundance and of excellent quality, he observed large bubbles of petroleum floating on the surface of some streams. On digging for the foundations of a magazine in the same district, there was a strong gush of petroleum, but the source was closed, as there were no roads nor facilities of transport. No one thought of utilizing this hidden wealth (as there is, I believe, much of the same description in Basilicata and the neighboring provinces), for there were no roads, communal, provincial or national; and had the same system of government been continued, the ground might have yet been undisturbed. Signor Venini-Poma, who has substituted petroleum for coal in heating steam boilers, claims to be the first who so applied it. Prof. Casola, however, an eminent chemist whom I well remember, was the author, it is asserted, of the system of locomotion by petroleum. He had an establishment in the Largo di Castello, which was filled with specimens of the various kinds of coal or asphalt found in the far south, and there he made many experiments and proved the locomotive power of petroleum. It was Prof. Casola who discovered the petroleum of S. Giovanni Incarico, and he would have done much with enlightened encouragement to have improved the economic conditions, especially of southern Italy; but, thwarted and discouraged, he died of a broken heart. I knew him and many of the facts now brought before the public, and I think that it is time for speculators to visit those districts, and study how the valuable products lying hid beneath the soil could be easily and economically utilized.—*London Mining Journal.*

"HAVANA" CIGARS FROM PAPER.—The straw paper manufacturers of the Chatham portion of Columbia county, N. Y., have for many years been aware that their product has nearly all gone South, and been used in Cuba as fillers for cigars. None of them manufacture specially with this end in view, although their paper is well adapted for "bogus" cigar making. The paper used for the purpose indicated is of the lightest weight (7 to 7½ lbs.) it is possible to make. There is one mill in the county located at Queechy (town of Canaan), which manufactures the straw paper expressly for wrappers—not fillers. The Queechy Paper Co.'s paper mill is situated on a creek but a short distance below a lake, and being at the head of the stream, the water is of much greater purity, and hence their ability to produce the desired article of paper. The straw paper used in filling the Havana cigars is saturated with a decoction prepared from the stem and refuse of Havana seed leaf, mingled with which are extracts of liquorice root, senna, etc. The paper is so skillfully stamped to resemble the tobacco leaves, the very veins of the leaf being perfectly imitated, that it can seldom, if ever, be detected from the genuine article.—*Paper World.*

A NEW and peculiar variety of coal is described in the *Neves Jahrbuch für Mineralogie*. It is found on the northwestern bank of Lake Ouega, Russia, in strata stated to belong to the Huronian formation. It differs in its physical, as well as its chemical, properties both from anthracite and graphite. Pure varieties show a strong metallic luster, which remains even after exposure to a dull red. Its hardness varies from 3.5 to 4, and its density at 4°C is 1.841. It is highly hygroscopic, an analysis yielding: Carbon, 95.50; hydrogen, 0.40; nitro-

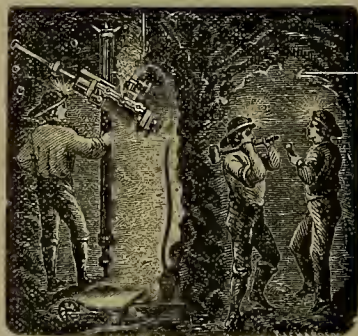
gen, 0.41; water, 7.76; and ash, 1.01. When free from water the percentage of carbon runs up to 98.11%, so that it is richer in carbon than anthracite, though it contains less hydrogen, no oxygen and much nitrogen. The "black earth" from Olonez is distinguished from graphite, which it resembles much, by the fact that it does not yield graphitic acid or "Brody's graphite" with a mixture of nitric and sulphuric acids, nor does it burn as rapidly as graphite.

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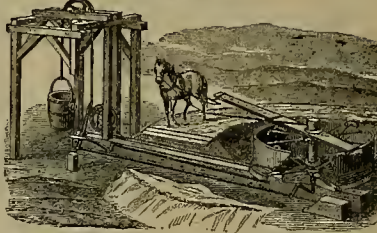
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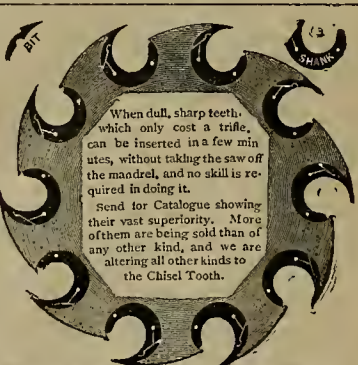
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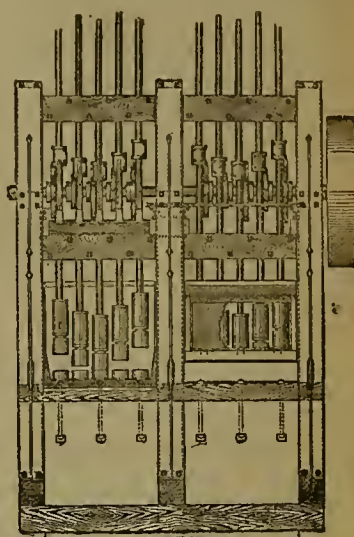
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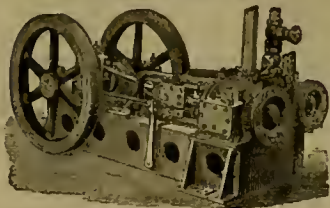
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2 lb doz.....37	@37
do Beef, 4 lb doz.....50	@50
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2 lb doz.....50	@50
Beef Tongue.....50	@50
Preserved Ham.	
2 lb doz.....60	@60
Deviled Ham, 1 lb.	
do.....40	@40
do Ham, 1 lb doz.....30	@30
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3 lbs.....75	@75
2 lb.....75	@75
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3 lbs.....75	@75
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Australian, ton.....	@50
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Bellingham Bay.	
Seattle.....50	@50
Cumberland.....12	@12
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Lehigh.....11	@11
Liverpool.....50	@50
West Hartley.....	@50
Scotch.....	@50
Scranton.....	@50
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Wellington.....75	@75
Charcoal, sack.....75	@75
Coke, bush.....60	@60
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Sandwich Id, lb.....	@15
Costa Rica.....15	@15
Guatemala.....15	@15
Java.....24	@24
Manilla.....15	@15
Ground, lb.....25	@25
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Sao to Dry Cod.....41	@41
do in cases.....5	@5
Eastern Cod.....71	@71
Salmon, bbls.....70	@70
Hf bbls.....35	@35
1 lb cans.....130	@130
Phid Cod, bbls.....	@130
Hf bbls.....	@130
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Hf Bbls.....95	@95
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Plaster, Golden.	
Gate Mills.....300	@300
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bbl.....125	@125
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Corn Meal, lb.....21	@3
Sugar, wh. crehd.....12	@13
Light Brown.....8	@8
Onion, Green.....23	@35
Tea, Fine Black.....50	@60
Finest Japan.....55	@60
Candles, Adm'te.....15	@25
Son Oal.....7	@10
Rice.....8	@20
Yeast Pwdr, doz.....150	@200
Can'd Oysters doz.....350	@50
Syrup, S F Golden.....75	@102
Dried Apples, lb.....10	@14
Ger. Prunes.....12	@10
Figs, Oal.....3	@15
Peaches.....11	@10
Oils, Kerosene.....50	@60
Wines, Old Port.....350	@500
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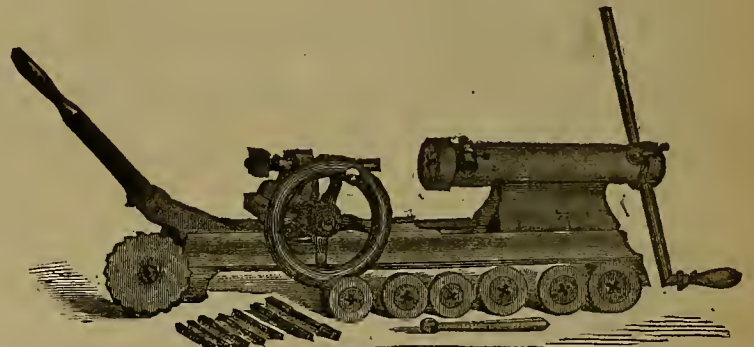
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Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, Room 87, S. F., August 16, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a dividend No. (58), of Fifty cents per share was declared, payable on FRIDAY, the 20th day of August, 1880. Transfer books closed until the 21st instant. W. W. TRAYLOR, Secretary.

Gover Mining and Milling Company.

Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

Notice is hereby given that at a meeting of the Directors held on the Eleventh day of August, 1880, an assessment (No. 43) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 402 Front street, room 8, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Thirtieth day of September, 1880, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Eleventh day of October, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

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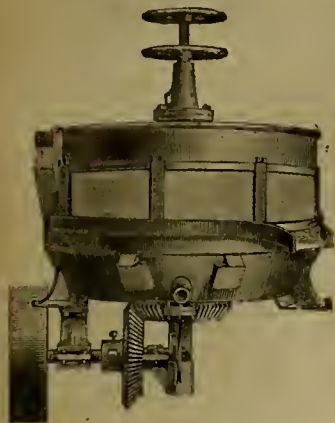
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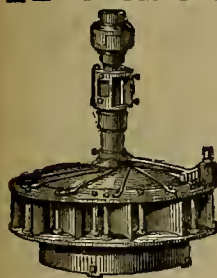
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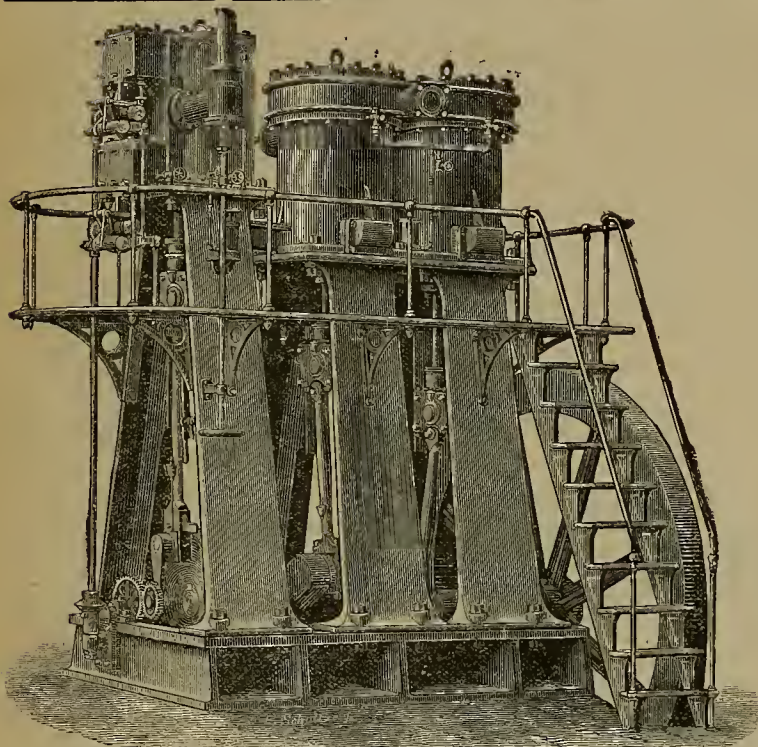
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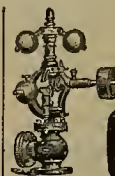
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The Inter-Oceanic Ship Railway.

Obstacles in the Way of New Enterprises and Inventions, Strains upon Ships, Etc.

That ships of the largest size with their cargoes, can readily be taken from the water, quickly transported by rail across the Isthmus and launched once more upon the ocean, is unquestionable. It is unfair and uncomplimentary to assume that any enlightened community is ignorant of this fact, and we enter into no argument to prove what, in the light of recent achievements, is almost a self-evident proposition. Whether it is wise thus to transport ships and cargoes is another question, concerning which no thoughtful person need be told there must be diversity of opinion. There is an ultra-conservative element in all communities strongly inclined to resist any innovation upon the good old way. It looks upon the suggestion of an improved method, process or machine as an offensive assumption of superior wisdom severely to be reproached and frowned upon. What if the man has devoted half a lifetime to the solution of his problem? So much the worse. Unusual persistency in the investigation of a single subject, especially in a new direction, over an unheated tract, is set down as evidence of mental aberration—proof positive of an unsound mind. The opinion of such a person may be of some value on other subjects, but, in the line of his speciality, before its reduction to practice, or in other words, in what this unprogressive element is pleased to term his hobby, it must not be permitted to weigh for a moment against the dicta of those who have given this matter little if any previous thought. A wise and prudent conservatism is the balance wheel and safeguard of society; and for this we have the greatest respect. But, there is a blind, unreasoning conservatism that would block the wheels and stay the oar of progress evermore. It bitterly opposed Stephenson's efforts for the introduction of the railway. It chafed lustily when Fulton's little steamer stopped a few yards from the shore and drifted down the stream. It gave audible vent to its disappointment when the boat started once more on its way, and hushed its voice in sadness as she steamed out of sight.

The electric telegraph was invented by Morse in 1832—publicly exhibited, and recommended by scientific men in 1835, again in 1836. Exhibited before the Franklin Institute and warmly endorsed thereby in 1837. Soon after exhibited before the President, Cabinet and members of Congress; appropriation therefor was recommended by Committee on Commerce in 1838; obtained in 1843, and on the 27th of May, 1844, the first commercial line was completed, and the first message, "What hath God Wrought?" transmitted from Washington to Baltimore, by Miss Anna Elsworth.

The numerous successful experiments we have specified over lines varying from a fourth of a mile to ten miles in extent, so convincing to those who understood the subject, had, as is often the case, a directly contrary effect upon the element of which we are speaking, which set Morse down as a visionary, and his telegraph as a humbug; because without capital and with his crude apparatus made out of a picture frame and old clock, he did not immediately achieve a financial success. But the value of his invention was appreciated and warmly endorsed by scientific men from the start. Unfortunately these men, in this country, are seldom capitalists, and mankind has a sovereign contempt for brain unassociated with coin; indeed, cannot often be convinced of its existence. It has little faith in the reports of experts, or in the certificates or affidavits of those who have made tests, unless these reports, certificates and affidavits are backed by the cabalistic signs of £. s. d.; often not even then. Ample evidence of this fact lies thickly strewn all along the pathway of progress.

For nearly 14 years the sneering crowd of doubting Thomases had held the great inventor at bay, and probably would have held him to the day of his death, had there not been a few scientific men in Congress.

Similar remarks apply to all important inven-

tions and all great enterprises. Witness the Overland railway, Susquehanna, Mississippi jetties, St. Louis bridge—in short, all propositions emanating from those who, by dint of hard labor and patient investigation, are emboldened to claim, and have a right to claim, a knowledge of what they are about. This unprogressive element seems to feel personally aggrieved therewith. Why should this man investigate the subject until he knows more about it than we do? It is not true. He has not done so. Perish the thought! There are others who exam-

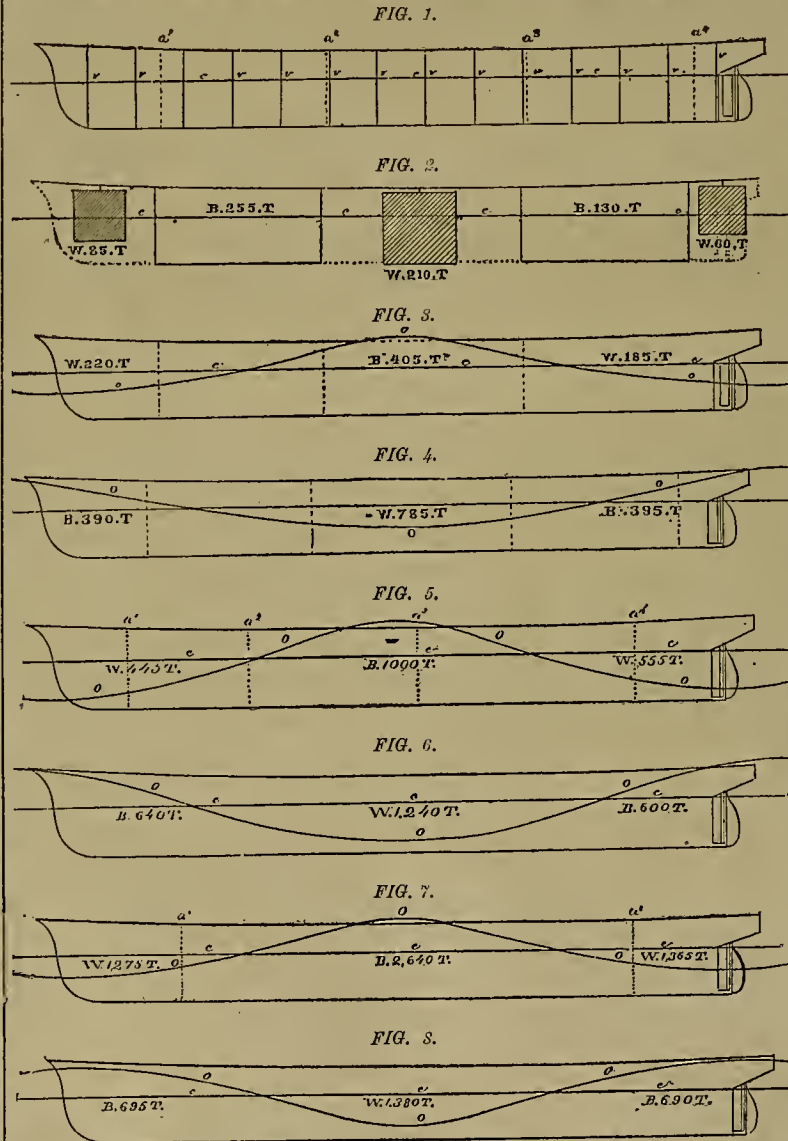
they not unfrequently discover their error when the opportunity they ought to have embraced has ceased to exist, and in this, as in other things, they pay for their learning.

This unprogressive element learns nothing from experience. It is never more ready to pronounce its dictum than upon subjects concerning which its ignorance is most profound. It is an obstacle that cannot be avoided. It confronts the inventor at every turn; stands ever in the pathway of progress, and must always be taken into consideration by those who

ever of the actual facts, with a shrug, a wink, a snicker, and a grin, it consigns for the time being many important enterprises, scores of useful inventions, to the limbo of forgotten things. But there are men who rise like Banquo's ghost, and down at no one's bidding. They work on until they reach the end of men of nerves and men of means, who are willing to listen and competent to judge, for there are such men, who reason in this wise: This man appears to be moderately intelligent. There is about him no apparent evidence of insanity or imbecility. He has devoted much time and some money to this investigation of his subject, and claims to understand it. After all this investigation it would be strange if he has not learned something. He may have hit upon something valuable. Such things have happened and may happen again. We can afford to examine a hundred schemes for the sake of finding a single good one. Let us hear what he has to say. In most cases we find the man is mistaken. He is ignorant of the mechanical or engineering principles lying at the foundation of what he is attempting to do, though perhaps a good workman and skillful in his line. He has not made himself familiar with the present state of the art. He is working out an old idea that has been tried and abandoned, or has reinvented something already in successful operation. He has introduced some doubtful element, or some principle that has not been sufficiently tested; or his scheme may be good, but there are others of the same character that are better. His plan may be ingenious and skillfully worked out, but there is no money in it. One man wants to get up a line of street cars where there is not sufficient population to sustain it. Another has invented a machine which he says will do a certain amount of work with 5-horse power. A moment's calculation shows that the work alone, irrespective of friction, will require 20-horse power. Another has invented, and it is astonishing how many have invented, perpetual motion. This is a mechanical impossibility. Another has invented an apparatus for making post-holes. Take that to our friend Agricola; we are not in the post-hole business. Another has an invention for exterminating rattlesnakes; but where can we get the snakes? A few minutes' courteous attention is sufficient for all such cases as these. Occasionally a matter comes up that requires a wise investigation. If it is at all in the line of our possible interest, and if successful, would be important, and especially if it is in the line of the projector's business or profession, we listen to all he has to offer, and, if in doubt, call in an expert, requiring him to present his doubts or objections, if any he has, to the projector, and give him an opportunity, if he can, to remove them. This, of course, involves some labor; but many a good thing is lost by refusing to look at it. By and by the right thing comes along, and we are rewarded for all our trouble. This would seem to be a reasonable view to take of the matter; but those who take this view are rare, and it is hard to find them. Great persistency, therefore, is necessary on the part of those who wish to accomplish anything, however important, for which they, themselves, have not the requisite means. But, persistency is not proof of wisdom. There are those whose persistency would "pierce the dull, cold ear of death," who yet know nothing whatever of the subject outside of their own experience, and this, when the experience of hundreds of men, and of a thousand years, is within our reach, is a matter of little importance. But these men make their way by sheer persistency. Unable to demonstrate their propositions, it is with the uninvestigating element, comprising by far the greater portion of the race, that they find their opportunity. Hundreds of thousands of dollars are annually squandered in undertakings that any person reasonably familiar with the subject can see at a glance to be unsound. Nor is it sufficient to examine a single enterprise or a single machine, and judge from that alone. Many an enterprise, many a machine judged by itself, may be a success, yet compared with other enterprises or other machines of a similar character, is an utter failure. Hence, the ship railway should be compared with the ship canal; steamships with vessels propelled by sail, and so on.

Engineering problems and mechanical im-

[CONTINUED ON PAGE 150.]



DIAGRAMS SHOWING THE DISPOSITION OF WEIGHT AND BUOYANCY OF VESSELS IN DIFFERENT POSITIONS.

line a new invention, understand and appreciate its value, but discover that, for every ten dollars that they could save by its use, the inventor might make one—and they "go" for that one. Instead of feeling that the inventor is rendering them the great service of largely reducing their expenses, they think he is robbing them of one-eleventh of their legitimate savings; and rather than submit to this, they will use the old machines, forgetting that by so doing they mulct themselves ten dollars to the inventor's one. But, these patient, persistent, investigating workers have a strange habit of succeeding at last, and posterity "writes down as asses" those who attempted to block their way, though it cannot be denied that inventors, as a rule, see things at first only from their own stand point, and are so unreasonable that even liberal capitalists can do nothing with them, and

would inaugurate any great enterprise or introduce anything new, or that may be supposed to be new. It is well that inventors do not realize this fact until their inventions are completed, or they would be rarer than the angel visits popularly supposed to be "few and far between." This element seldom appeals to the public through the press. It is far too shrewd for that. It cannot conceal from itself its ignorance. It knows that its sophisms would be punctured and collapse like a bag of wind. But its influence is none the less felt. It shrugs its shoulders and refuses to invest. It hopes it is all right, but, with a knowing wink, fears there is something wrong. Thinks it would be just as well to have the thing tested at some one else's expense—and so on, *ad infinitum*, *ad nauseam*. Without one word of argument, without investigation, with no knowledge what-

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EBS

Mines in and around the Silver Peak Salt Basin, Nevada.

EDITORS PRESS:—Dull enough for these many years have been mining matters in this remote corner of Nevada, notwithstanding this may be considered one of the oldest camps in this part of the State. The mines in the Red Mountain district adjoining this on the west were discovered in 1863, causing at the time no little sensation because of their obvious value. The next year the Great Salt Basin Mining and Milling Co. put up there a 3-stamp mill for reducing the ores, which are gold bearing. That year the silver mines in this district were discovered, the same company having put up here a 10-stamp mill in 1865. After a short but tolerably successful run these mills came to a standstill, and with some brief exceptions, have remained idle ever since, their suspension having been due to had management and the great cost that then attended mining here. This property, which is a very extensive one, has lately passed into the hands of new owners, who, it is said, will shortly resume operations upon it. Included in this estate are nearly 100 different mining locations, 1,000 acres of woodland, two mills, houses, shops, and other outbuildings in great number, besides quite an extended system of railroads connecting their mills with the mines. Although a great deal of money has been expended here, much of it foolishly, these mines under a good management could be made to pay handsomely and perhaps very largely. It seems a pity that such a property should have been suffered to stand idle so long. It employed at one time over 100 men, and with reduction works adequate to its productive capacities, could, no doubt, give profitable employment to twice that number.

Very different from that of Silver Peak is the history of

The Montezuma District

Lying over against this in the high range of mountains, 15 miles to the east. Little has ever been heard of it. It has no place on most of our maps; capital has never gone to its aid; it has taken care of itself—paid its own bills and enriched in a small way a good many of our pioneer miners. What values in the shape of ores and bullion have gone out of the district I have no means of knowing with much exactness—half a million certain—possibly twice that much. During its earlier history all the ore raised there was shipped away, mostly to Austin, I think, to which place its carriage must have amounted to \$100 per ton, at least. It must have been good ore to stand such a transportation tariff, and leave margin for profit after defraying costs of extraction, reduction, etc. In their upper portions these Montezuma lodes carry a sulphuret mixed with a chloride ore which as depth is gained runs into galena and a carbonate of lead containing from \$40 to \$200 silver per ton, and from 20% to 40% lead. At a central point in the district a 10-stamp mill was put up some years ago. This mill has performed good service, having, with the aid of a Howell roaster, reduced a prodigious quantity of ore, making, perhaps, as large net earnings as any small mill ever erected in Nevada. But for the reason above stated, much of the ore here to insure its economical treatment requires now a smelting furnace, persistence in its reduction by milling involving a large percentage of loss. It is reported that the company, who own most of the property in that district, will shortly put up a large sized smelter on a site convenient to their mines. Should this be done it will revive business at Montezuma, where, from the want of a structure of this kind, it has for several years past been languishing. Montezuma is the best wooded district in this part of the State, timber there covering a great area, the growth being dense and many of the trees reaching a large size. There is more water there too, and of better quality than is common in this section of country. If they get smelters we may look for renewed activity and a long-continued prosperity over at Montezuma.

A Slight Awakening—Oppressive Transportation—Relief Through a Railroad.

There is some revival of the mining interests all around here; in every direction there is more stir than has been noticeable for many years past. This grows out of a variety of causes. In the first place, the mines themselves are good—the lodes often large and generally of a permanent kind, while the ores, which carry either gold or silver and sometimes both, are uniformly of high grade. But what has most served to awaken new interest in mining here is the promise of a railroad soon to connect these districts with the outside world. There is not in all Nevada a more difficult region to be reached with heavy freights than this. This camp, the center of a great mining territory, is 225 miles from Dayton, nearest point on any railroad. The intervening country is dry, barren and much of it sandy, and so continues to be for a long distance beyond this point. With the exception of hay, vegetables, fuel and some little grain raised for horse feed, nearly everything required for human use, wear or subsistence, as well as for mining purposes, has to be hauled by team over this long stretch of desert,

having before being transferred to wagons undergone several hundred miles of railroad transportation. Every commodity comes to us then loaded down with freight charges that very often greatly exceeds its first cost. The freight charges on a ton of goods, machinery included, from San Francisco to this place amount now to over \$120, the rates paid on most of the machinery brought in here having been much larger. That under those oppressive burdens such extensive improvements should have been made, and the mines been so much developed as they have been argues a great richness for the ores here disposed of.

Should this road be built, or rather extended as far south as this point, it would infuse new life into the mining industries throughout this section of Nevada as well as the adjoining mining districts of California. The impression obtained here at one time that this road was to terminate at Walker Lake, but latterly we hear that it is to be carried on into the neighborhood of Columbus, which would bring it within 45 miles of this place, and about the same distance of Montezuma. To stop it at Walker Lake would evince a short-sighted policy on the part of the builders, as the worst and widest part of the desert lies between Columbus and that point. While the country from here to the Lake is sandy and sterile, it is generally favorable for railroad construction. The road brought on into the mines could not fail to prove a profitable investment, while a halt halfway might imperil its success. This road should therefore be built without halt and with as little delay as possible as far as Candelaria at least, if not the few additional miles further on to Columbus. This would bring it terminus to a point central to a great many important mining districts, as well as to the extensive deposits of borax that exist in the neighborhood.

Concerning the mines in the Columbus district and some less important outlying localities in this part of the State, you may look for something when you next hear from

SILVER PEAK.

Silver Peak, Aug. 25, 1886.

Into the Bonanza Group.

The north header of the Suro tunnel has passed through the Con. Virginia and California mines, and is fast nearing the point where it will connect with the Ophir, being at present in the Golden Gate ground, which adjoins the Ophir and Mexican on the east. The course of the tunnel will continue a little east of north until it connects with the Ophir, when it will hear more to the eastward for a connection with the Union shaft, thus passing diagonally through the Golden Gate ground at a depth of 1,600 ft. below the surface. Its connection with the Union shaft will be a very important one and anxiously looked for, as it will be of invaluable assistance in the way of drainage to the new bonanza deposits now being developed in the Sierra Nevada and Union ground.

It is easy to see that the Golden Gate, located in the very midst of these valuable developments, and with the Suro tunnel now making its way directly through it, is rather of an interesting piece of property at the present time, as the tunnel has over a thousand feet yet to go in order to reach the Union shaft, and all the way through the Golden Gate ground, passing directly beneath the heavy and prominent croppings in the cemetery, just north of Virginia. The Golden Gate Company, formerly the old Vermont Con., have their title fully perfected and covered by United States patent. They now propose to resume sinking their large new three-compartment working shaft down to a connection with the tunnel, and have levied an assessment for that purpose. They have excellent prospects already, but are going after their full share of the good things at that point.—Enterprise.

WILL POWER AND FASTING.—A young mechanic, condemned to four years' imprisonment in Italy, has managed to starve himself to death in 30 days. Dr. Tanner fasted 40, and is none the worse for it. But the Italian would die, while Tanner would live—a very important difference in the two cases. There used to be a theory that people need not die at all if their wills were strong enough. Absurd as it was, it contained a grain of truth. Weak-willed men succumb to accidents or attacks of disease, while men of strong will live through. The experience of army surgeons abounds in instances of remarkable recoveries of plucky fellows who seemed to have no chance of fighting off death, and of equally remarkable deaths of soldiers with flabby resolution who succumbed to slight wounds. On the whole, the mechanic's case is rather more interesting than Dr. Tanner's. Both confute a host of medical writers, who say that nine days' abstinence from food will kill a healthy man; but the young Italian has demonstrated that a man who tries to kill himself by the starvation process, may have a whole month finishing the job.—N. Y. Tribune.

REMARKABLE LACE WORK.—One of the chief lace-makers of Brussels is at work upon the veil and train which are to be worn by the Princess Stephanie, the daughter of the King of Belgium, upon her marriage to the prince imperial of Austria. Three hundred women have already been four months employed upon this veil and train, which will be more than three yards wide by five yards long. The lace is point d'aiguille, with the arms of Belgium and Austria on the border, and will be a wedding gift from the city of Brussels to the bride.

METEOROLOGICAL.

Application to the Distribution of Rain.

[By PROF. JOHN LE CONTE.]

The general physical considerations which have been enumerated afford a satisfactory explanation of the several features of the abnormal distribution of rain along the Pacific coast.

1. Increase of rainfall with increase of latitude.—It is evident that as we go north along the coast the temperature of the surface waters of the ocean (the vapor-furnishing apparatus), through the influence of the "Kuro-Sivo," is rendered comparatively warm; and, at the same time, the temperature of the land (the condensing apparatus), especially during the winter (the rainy season), diminishes with increasing latitudes. Hence, during the rainy season, or winter months, this cause must tend, as we advance toward Alaska, to progressively augment the excess of the temperature of the ocean above that of the adjacent land—the vapor-furnishing source above that of the condensing apparatus, thereby increasing the amount of precipitation along the northern portions of the coast.

2. Sudden increase of rainfall near latitude 41°.—This is a striking but very puzzling fact. We are not yet prepared to offer any satisfactory explanation of it. So far as we know there are no observations indicating any sharp and sudden depression in the temperature of the ocean waters just at Cape Mendocino. A careful study of the direction of the winds at this portion of the coast might throw some light on this point. A most important agent in the production of this anomaly in rainfall is, doubtless, to be found in the hypsometric relations of the land lying west of the Sierra Nevada mountains to the contiguous sea. The crowding of these lofty mountain ranges toward the shore line, which occurs just north of Cape Mendocino, must evidently tend to augment the rainfall at this portion of the coast. The following numbers indicate, approximately, the distances of the crest of Sierra Nevada from the shores of the Pacific ocean: At latitude 39°, along the parallel, 190 miles; at latitude 40° 30' (Lassen's Peak), along the parallel, 140 miles; at latitude 41° 30' (Mount Shasta), along the parallel, 94 miles.

3. No summer rains between latitude 33° and 41°.—This remarkable feature of the climate of this coast is clearly due to the excess of temperature of the adjacent land, during the summer, above that of the cool ocean on the west. This condition of things, while it augments the force of the west winds, renders the precipitation of the aqueous vapors of small tension, which they sweep from the cool ocean to the hot interior, a physical impossibility, since they are being carried to a region of higher temperature. Further north, along the coasts of Oregon, Washington Territory, and Alaska, the presence of a comparatively warm ocean, renders the conditions more favorable for summer rains.

4. Winter rains south of latitude 41°.—Along this portion of the Pacific coast, in consequence of the abnormal coolness of the ocean, the adjacent lands, even during the winter season, scarcely ever become colder than the contiguous sea. At this season of the year, while the monsoon features of the winds of this section of the coast disappear, yet we have presented the anomalous fact, that when the winds blow from the ocean it never rains. This is evidently due to the low temperature of the sea, which can only furnish vapor of feeble tension. The true rain-bearing winds come from the south and the southeast, bringing the warm vapors of high tension from the Gulf of California. These vapor-laden, warm south-east winds from the region of the Gulf of California, and the western coast of Lower California, deposit a very small amount of rain in the warm latitude of San Diego (33°), but precipitate their moisture gradually more and more copiously on their way to the higher and colder latitudes. It is a well-established fact, that near San Francisco, during the rainy season, whenever the wind veers to the west, and blows from the cool ocean, the rain speedily ceases, and it clears off. Further north, along the coast, where the influence of the "Kuro-Sivo" is felt, the sea-winds during the winter resume, to a greater or less extent, their normal functions, and become rain-bearing winds.

5. Less rain in the great valleys than on the coast.—This is the normal condition of things, since it is evident that the interposition of the coast ranges must tend to cut off more or less of the vapors from the interior valleys.

6. Maximum rainfall on the western slopes of the Sierra Nevada.—After the vapor-bearing winds have passed across the coast ranges and the great valleys, they reach the western slopes of the Sierra Nevada mountains. This high mountain range, and its cold, snow-clad sides, acting as powerful condensers, extract from the southerly winds the load of moisture which they bring from the regions of maximum evaporation in the Pacific ocean. This burden of moisture is almost entirely unloaded in passing over the land lying to the seaward and especially over the cold flanks of these lofty mountains, so that comparatively little is left for de-

posit on the arid plains of the Great Basin. On the western slopes of the Sierra Nevada we find a precipitation, which, following the usual law for windward mountain flanks, augments with increasing altitude, and attains a maximum at about from 5,000 to 7,000 ft. Lacustrine Basins West of Rocky Mountains.

After this digression on climatology, rainfall, etc., we now resume the consideration of the distribution of lakes west of the Rocky mountains. From the topographical sketch previously given, it is evident that there are three lacustrine basins lying west of the Rocky mountains, viz:

1. The Salt Lake basin, near the western slope of the Wahatch mountains.

2. The Humboldt basin, near the eastern slope of the Sierra Nevada and Cascade mountains.

3. The great valleys, lying between the Sierra Nevada and Cascade mountains on the east, and the coast ranges on the west. Most of the lakes of the Salt Lake and Humboldt basins are without outlets, and consequently their waters are more or less highly charged with saline matters. This is evidently due to the small amount of rain and snow supplied to these arid basins in recent geological times. The lakes of the great valleys have outlets, at least during the rainy season. For example, Tulare lake ordinarily has no outlet, but at high water its surplus flows through a slough into the San Joaquin river. Near this lake are numerous shallow lacustrine depressions, some of them at present designated as dry lakes, which contain more or less water during the wet season.

Table.

In the following table the lakes are grouped in conformity with the foregoing topographical divisions, commencing at the north and advancing south in each division:

Lakes in U. S. West of Rocky Mountains.

Salt Lake Basin.	Max. Length in Miles.	Max. Width in Miles.	Approx. Area in Sq. Miles.	Height of Surface above Sea Level in Feet.	Max. Depth in Feet.	Height of Bottom above Sea Level in Feet.
Great Salt.....	70	45	1,500	4,218	60	4,158
Utah.....	25	18	150	4,498	.....	.....
Serler.....	20	10	140	4,600	.....	.....
Fish.....	18	8	100	4,674	.....	.....
Franklin.....	16	5	80	6,200	.....	.....
Gositte.....	.....	.....	.....	5,052	.....	.....
Chelan.....	36	6	.....	.....	.....	.....
Harney.....	20	12	.....	4,150	.....	.....
Malheur.....	18	16	.....	.....	.....	.....
Albert.....	20	6	.....	.....	.....	.....
Sumner.....	18	8	.....	4,131	.....	.....
Upper Klamath.....	26	8	.....	.....	.....	.....
Warner's.....	32	8	.....	.....	.....	.....
Lower Klamath.....	15	6	.....	4,131	.....	.....
Rhett.....	10	10	.....	4,014	.....	.....
Wright.....	10	5	.....	4,470	.....	.....
Goose.....	28	9	.....	.....	.....	.....
Upper.....	13	7	.....	.....	.....	.....
Middle.....	19	6	.....	.....	.....	.....
Eagle.....	14	10	.....	4,005	.....	.....
Honey.....	17	14	.....	.....	.....	.....
Winnemucca.....	18	8	.....	.....	.....	.....
Pyramid.....	33	14	360	3,890	.....	.....
Humboldt.....	23	16	.....	3,920	.....	.....
Carson.....	13	9	.....	3,840	.....	.....
Walker's.....	25	7	.....	3,840	.....	.....
Mono.....	14	10	.....	.....	.....	.....
Owens.....	17	10	.....	3,589	51	3,538
Death Valley.....	30	11	.....	.....	.....	.....
Quinnault.....	6	3	.....	.....	.....	.....
Whitcomb.....	6	3	.....	.....	.....	.....
Clear.....	21 1/2	7 1/2	80	1,310	60	1,250
Tulare.....	34	23	687	200	40	160
Buena Vista.....	9	5	25	.....	.....	.....
Kern.....	8	4	13	282	17	205

A glance at the foregoing table is sufficient to disclose two facts: 1st, the great deficiency of physical data in relation to our western lakes, and 2d, the remarkable shallowness of all the lakes occupying the three lacustrine basins.

BLADDERS OF FISHES.—In a recent note to the Paris Academy, Prof. Marangoni gives the results he has arrived at in a study of the swimming bladder. He states, first, that it is the organ which regulates the migration of fishes, those fishes that are without it not migrating from bottoms of little depth, where they find tepid water; while fishes which have a bladder are such as live in deep, cold water, and migrate to deposit their ova in warmer water near the surface. Next, fishes do not rise like the Cartesian diver (in the well-known experiment), and they have to counteract the influence of their swimming bladder with their fins. If some small dead and living fishes he put in a vessel three-quarters full of water and the air be compressed or rarefied, one finds in the former case the dead fish descend, while the living ones rise, head in advance, to the surface. Rarefying has the opposite effect. Fishes have reason to fear the passive influences due to hydrostatic pressure; when fished from a great depth their bladder is often found to be ruptured. Thirdly, the swimming bladder produces in fishes a two-fold instability—one of level, the other of position. A fish, having once adapted its bladder to live in a certain depth, may, through the slightest variation of pressure, be either forced downward or upward, and thus they are in unstable equilibrium as to level. As to position, the bladder being in the ventral region, the center of gravity is above the center of pressure, so that fishes are always threatened with inversion; and, indeed, they take the inverted position when dead or dying. This double instability forces fishes to a continual gymnastic movement, and doubtless helps to render them strong and agile. The most agile of terrestrial animals are also those which have least stability.

MECHANICAL PROGRESS.

To Obtain Well Defined Castings.

To obtain sharper and better defined castings, Messrs. Thorp and Tasker, of Whitefield, Lancashire, England, enclose the mold or molding box within a chamber, in which a suitable degree of vacuum can be obtained, and they run in the metal in vacuo and afterwards admit air or gas into the chamber. In the apparatus they have devised for the purpose the molding box is enclosed in a metal chamber, which is provided with a lid or door, the meeting surfaces being planed or faced, so that a suitably air-tight joint is obtained when the door is closed, with or without the interposition of a ring or of packing, as preferred, or found to be most efficient. A shaft to carry a crucible or pot to hold the melted metal, passes into the interior of the chamber, and is provided with handles or with arrangements for tilting the said crucible or pot. A sight hole closed with glass, or two or more of such holes, is or are formed in said door or in any suitable situation in the walls of the chamber, so that the progress of the running in may be inspected. The said chamber is connected with a vacuum chamber, in which a degree of vacuum is produced by means of an air-pump or of air-pumps, or by other suitable means. When the arrangements for the running are completed the door of the molding chamber is closed, and the communication with the vacuum chamber is opened. The metal is then run into the mold, and air is admitted into the molding chamber. They prefer to use a two-way cock, which, when turned to shut off the connection with the vacuum chamber, opens a passage for the admission of air to the molding chamber. The last named chamber may be large enough to contain more than one molding box. They may connect said chamber directly with the air-pump, so as to dispense with the vacuum chamber, or employ the air-pump to increase the tension of the vacuum partly formed by the said vacuum chamber. In place of the crucible or pot being enclosed within the chamber they may pour the metal into a passage leading from the outside to the inside of the chamber, or into a container communicating with the interior of the chamber or with the interior of the mold, the atmospheric pressure forcing the metal into the chamber or mold, when a plug closing the passage is withdrawn or eased, or when the passage is otherwise opened.

A Substitute for the Crank.

A device has recently been patented by Mr. Samuel W. Hanson, of West Union, West Virginia, intended to replace the crank in steam engines and other machinery where the crank is now used. On the end of the shaft, to the place normally occupied by the crank, there is a heart cam, across the face of which, and at right angles with the shaft, a bar slides in suitable guides. The bar carries a lever, whose pivot is parallel to the main shaft and in the same horizontal plane. This lever has at each end a friction roller which rolls on the periphery of the heart cam, and from one side of the lever projects an arm which is connected by a rod, with a pin working in a slot in the bar already mentioned. A slide on the bar is provided with two pins projecting downward on opposite sides of the pin connected with the rod. The slide is connected with a hand lever, by which it may be moved lengthwise on the bar. The bar is connected with the piston rod of a steam cylinder or any other prime motor either directly or by means of a lever. The bar being reciprocated exerts a pressure on the periphery of the cam through the medium of the lever and its rollers. One end of the lever is below the center line of the bar, while the other end is above. This arrangement insures the rotation of the cam in one direction, and to reverse the motion of the cam all that is required is to reverse the position of the lever by moving the slide. The inventor claims that the cam has no dead points, that the power and motion are equal throughout the stroke, and that for this reason a fly-wheel is unnecessary. He also states that he gains a great deal of power over the crank, that it will run either very slowly or with any desired velocity, that it is capable of withstanding jars or shocks it is likely to receive, and is not liable to get out of repair. Further information in relation to the invention may be had by addressing the inventor as above.

Slipping of Locomotive Driving-Wheels.

Some very careful experiments have recently been made on the Northern railway of France to determine the slipping by locomotive driving-wheels at speeds varying from 43 to 74 miles per hour. The first experiments were made with a four-coupled engine having coupled wheels 7 ft. in diameter, and carrying a total load of 27 tons. It was found that this engine, when running light and in fine weather, at the high speed of 74½ miles an hour down a gradient of 1 in 200, apparently slipped continuously to the extent of 19%, while other engines also gave results of a similar kind, the slipping at maximum speeds apparently varying from 13% to 25%. Other and more recent experiments, however, show a different result at

speeds varying from 43 to 56 miles per hour. For this purpose six locomotives of three different types were used, five of them having four-coupled wheels, while the sixth was a Crampton engine, with a single pair of drivers. The circumference of the wheels was obtained by measuring the rails traversed by one revolution. The results showed that under the conditions of the trial no slipping whatever occurred, and that any doubts in regard to the partial slipping of driving-wheels under the ordinary conditions of locomotive working, may be set at rest, and that this supposed action need not be taken into account as a cause of wear and tear.

Singular Break in a Shaft.

The main shaft of the New York Steam-Power Company recently gave out under rather peculiar circumstances. The shaft was about 16 ft. long and 6 inches in diameter, and the fracture occurred within one of the boxes. When the shaft failed to do its duty it was discovered that the area of this final fracture was not over a half inch square, while the surfaces of the remainder of the fracture were black and greasy, showing that the break, with the exception noted, was an old one. The break extended diagonally across the shaft, and being jagged and irregular, the compression of the box and the small portion remaining unbroken had, for a considerable time, been sufficient to hold the shaft together. Why the force which produced the original fracture did not complete its work and destroy the shaft at the time, and why the shaft was afterwards able to run by the mere pressure of the box holding the two broken pieces together, are questions which have been exciting the attention of the thinking mechanics of the neighborhood for several days. From small pieces of the broken shaft which we clipped off evident signs of granulation in the iron were discovered.—*Blacksmith and Wheelwright.*

NOTES ON STEEL.—Steel merely hardened is hardest on the surface, while in steel that has been tempered the exterior is the softest. In the one case because the surface was cooled in advance, in the other because it was heated in advance. Steel which has rusted can be cleaned by brushing with a paste composed of one-half ounce cyanide of potassium, one-half ounce castile soap, one ounce whiting, and water sufficient to form a paste. The steel should first be washed with a solution of one-half ounce cyanide of potassium in two ounces of water. As the cyanide of potassium is a very dangerous poison, and as its fumes, when inhaled in sufficient quantities, will produce death, it should be handled with great care, and kept in a tightly corked bottle.

STEEL JOISTS are being made at a few factories in England and on the continent, but certain difficulties attend the rolling, which as yet prevents their manufacture on a large scale. Steel plates for bridges also are not as yet used to the extent anticipated, and the long span bridges in which their utility is undoubted, do not often occur. For boiler plates the considerable advantages which steel offers are being availed of, and for flanging and other treatment, where high quality Yorkshire iron was formerly used exclusively, steel is, says Messrs. Matheson and Grant in their half-yearly engineering trades report, found to be considerably cheaper, especially for plates of large dimensions.—*The Engineer.*

RETROGRESSIVE INVENTION.—It is reported that an American inventor proposes to apply dynamo-electricity to the working of a stone-breaker, with which he makes from 1,000 to 2,000 blows per minute, the actual breaking being effected with a wedge-shaped hammer. As to the actual crushing arrangement, it may possess certain advantages; but to use the power at second-hand instead of direct is retrogressive. Ten-horse power indicated at the steam-engine will give scarcely six-horse power after passing through a dynamo machine—that is to say, the alleged improvement would reduce the work done at a given cost to just over one-half.

METALLIC SHINGLES.—It is specially important that blacksmiths and carriage builders should have fire-proof roofs. A firm in New York manufacture a patent metallic shingle, which possesses so many advantages that no one in want of a good roof should fail to investigate its merits. They are much lighter than slate (weighing but one-fourth as much). Being laid in courses—each shingle by itself—no harm can result from the expansion or contraction of the metal, as is the case with tin roofs. Unlike wood shingles, they cannot warp or shrink. They make a more ornamental roof even than slate, as they can be painted to suit the taste. Many prominent buildings in different parts of the country have been covered with these shingles.

A COAL ECONOMIZER.—A company is being started in New York for introducing an article called the Coal Economizer, by the use of which it is claimed a saving of 20% in coal can be made. The economizer is in the form of a black powder, and is used by dissolving it in water and sprinkling the liquid over the coal in the bin. The theory of its operation is, that, through a chemical action, the gas which usually escapes in combustion is retained and utilized.

SCIENTIFIC PROGRESS.

Changes in the Earth's Figure.

An interesting hypothesis has been promulgated before the French Academy by M. Faye. It has been long known from geodetic surveys and pendulum experiments that continents and mountain ranges do not exert that attraction on the pendulum which might be expected of them; judging from the observed attraction of such isolated masses as Mount Schellhorn in Scotland, or the great pyramid. In fact the deficiency of mountains in this respect is so striking that in order to account for it, geologists and astronomers have imagined that there are vast cavities underlying continents and mountain chains. A somewhat different explanation of the feeble action of the Himalayas on the pendulum has been offered by Sir George B. Airy, who supposes that the attraction of the mountains is counteracted by still fluid lakes of rock below them. But this suggestion does not meet the fact, elicited by M. Saigey, that the attractions on islands of the sea is greater than it ought to be. It appears to be clear, however, that there is a relative lack of matter under continents, and an excess of it under oceans. The hypothesis of M. Faye would seem to solve the problem in a very simple and reasonable manner. He holds that under the sea the earth's crust has cooled much more quickly than under dry land, and hence the solid seabed is denser and thicker than the subcontinental mass. Water is a good conductor of heat as compared with rock, and being liquid it is also able to convey heat from its underlying basin. Geodesy shows that the present figure of the earth is an ellipsoid of revolution; but if M. Faye's hypothesis is correct it has not always been so. At first it was an ellipsoid, but the unequal cooling of the earth due to the liquid mantle covering it, led to unequal stress and the elevation of continents where the crust was thinner. These continents, according to M. Faye, surrounded the north pole, and the level of the ocean over our hemisphere was raised, thus bringing the earth to a more spheroidal form. Finally, as the cooling continued, the austral continents attracted the oceans and the figure became once more ellipsoidal, as it is to-day. If this ingenious speculation were the true one, it would unquestionably help geologists to explain the origin of glacial periods.—*Engineering.*

THE HEIGHT OF THE ATMOSPHERE.—HERT Ritter has published recent calculations on the height of the atmosphere, approaching the subject in a manner different from that of earlier investigators. His principle is this: The quantity of heat which must be communicated to a mass of air cooled to absolute zero to bring it, under constant pressure equal to the atmosphere, to the state of the lowest layer of the atmosphere, is the calorific equivalent of the mechanical work which would have to be expended to lift this same mass of air from the earth's surface to the limits of the atmosphere. Supposing, first, our atmosphere to consist of a gas which would retain the properties of a perfect gas to absolute zero, he gets the height 15.53 miles. Then, making the same calculation for an atmosphere of pure water vapor, he gets 217.43 miles. Considering, lastly, that while it is not possible to make an exact calculation for real gases, which certainly condense and solidify like water vapor before reaching absolute zero, one must obtain a result a little different from that found in the case of such vapor, he concludes that the height of our atmosphere must differ a little from 217.5 miles—a number which agrees well with that deduced by Schiaparelli from the observation of falling stars.

NEW POLARIZING PRISM.—M. Crova commends, for photometric purposes, in the *Journal de Physique*, M. Prazmowski's polarizer, which is a Nicol, with faces normal to the axis of a prism, the two halves of which are joined with linseed oil. It requires large pieces of spar, and the joining is long and difficult, but there are several advantages. Thus the layer of oil (unlike Canada balsam) cures hardly any loss of light; its index, 1.485, being nearly equal to the extraordinary index of spar, the polarized field is limited on one side, as in Nicol's, where the total reflection of the ordinary ray commences, by a red band; but the second limit, corresponding to total reflection of the extraordinary ray, is thrown out of the field of vision; the angular value of the polarized field is thus increased. The increase of field, the angular separation of the only colored band, and the direction of its bases, normal to the axis, are qualities to be appreciated in certain cases.

TOBACCO SMOKE PRODUCTS.—MM. Le Bon and Noel presented, the other day, in the French Academy, three flasks containing the following products extracted from tobacco smoke: 1, Prussic acid; 2, an alkaloid of agreeable odor, but dangerous to breathe and as poisonous as nicotine; 3, aromatic principles still undetermined, but contributing, with the alkaloid mentioned, to give tobacco smoke its perfume. The alkaloid in question is thought to be identical with a compound—collidine—the existence of which has been observed in distillation of various organic substances, but whose physiological and toxic properties have been overlooked.

Microscopical Examination of Ice.

Mr. M. A. Veeder has communicated to the *American Naturalist* some interesting results derived from recent microscopical examinations of ice which had been taken from pools of stagnant water in canals and ponds. The specimens were all taken from the interior of large blocks. This ice was found to be much more impure than even such ice is generally supposed to be. The small effect upon the fertility of germs is particularly noticeable. Mr. Veeder says:

On melting those fragments, and examining the water thus obtained with various magnifying powers up to 900 diameters, bits of vegetable tissues and coniferoid growths are usually recognizable at once. I have not noticed animalcules in an active state in water from ice that has just been melted; but, upon allowing such water to settle and become warm at the ordinary temperature of a room occupied for living purposes, the sediment deposited may be found to contain, after some hours, monads whose movements are easily discernible with a magnifying power of from 200 to 400 diameters. Upon allowing this water to stand still longer, I have found the coniferæ growing thickly, and, in some instances, forming clusters or bundles frequented by minute animalcules, the entire appearance in this case being similar to that presented by the nests occupied by the young of the common *Paramecium* which I have seen in stagnant water. As the result of these investigations I am fully convinced that freezing does not free water from filth due to the presence of sewage or decaying vegetable matter; and further, that it is altogether probable that the germs from which animalcules are developed, if not the animalcules themselves in a quiescent state, are present in very much of the ice taken from stagnant water. This being the case, it would seem that the use of such ice in drinking water is hazardous, to say the least.

ARTIFICIAL CITRIC ACID.—Among the latest triumphs of the synthetical chemist we have to record the preparation of citric acid by Messrs. Grimaux and Adam, of France. All the principal acids found in the vegetable kingdom had already been prepared, and for several years citric acid, the acid of the lemon, the currant and gooseberry, has been the only one of which it could be said, "this acid has not yet been made artificially." Tartaric acid has been made several years ago from dibromosuccinic acid, and malic acid, the acid of unripe apples, from monobromosuccinic acid, an acid obtained from amber; but succinic acid itself was made from ethylene cyanide.

LAWS REGULATING THE SPHEROIDAL STATE OF MATTER.—P. H. Boutigny states that the temperature of bodies in the spheroidal condition is always below that of ebullition; for water it is 97° (206°-6° F.). The spheroidal matter is never in thermal equilibrium with the vessel which contains it, but the vapor which escapes from it is always of the same temperature as the vessel. The spheroidal matter reflects radiant heat. The volumes of matter in a spheroidal condition are in a ratio inverse to their densities, and their masses are uniform. Some of the phenomena seem to indicate a repulsive force acting at sensible distances before vapor can be disengaged.—*Comptes Rendus.*

A NOVEL APPLICATION OF CELLULOSE.—A French sculptor, M. Emile Jeannin, has found a novel and what promises to be quite a useful and important application of celluloid. Noting that celluloid becomes plastic at a temperature of 250° Fahr., he tried whether it would be a fit substitute for the electrotypes used for illustrations. He found that it makes sharp and clear impressions, and that it resists the wear of the press-work much better than the ordinary cuts, having printed 56,000 copies from a celluloid cut without visibly injuring it.

INFLUENCE OF WINDS ON THE BAROMETER.—When a balloon is borne along by a rapid current calculations of its altitude are not trustworthy. When the velocity is very great, the error may be as great as one-third of the estimated height. Kaemtz, from the study of barometric observations at Paris, Zurich, Berlin and Halle, found that the readings were effected by the direction of the wind. Montigny has discovered a similar influence at other stations, but at Brussels and Namur the influence is directly opposite to that at Antwerp.—*Les Mondes.*

EARTHEN FILTERING PLATES.—G. W. Reye & Sons, of Hamburg, make filtering plates from a mixture of one part of gypsum with three parts of imperial earth in water. They can be purified after using by washing or burning. When impregnated with carbolic acid they also become useful as disinfectants.

ACCORDING TO M. Ader, any mechanical action that disturbs the molecular condition of a magnet core develops, when the core suddenly regains equilibrium, in electric current capable of affecting the telephone.

IN AID OF SCIENCE.—The French government has granted to M. Pasteur the sum of 50,000 francs for the purpose of enabling him to carry out his researches on the contagious diseases of animals.

AERIAL PHOTOGRAPHS.—By placing a camera in an aperture in the bottom of the car of a balloon very successful negatives have been recently obtained in Paris of the landscape below.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Aug. 12.	Week Ending Aug. 19.	Week Ending Aug. 26.	Week Ending Sept. 2.
Alta.	51	43	8	51
Alta.	2	11	3	2
Andes.	1.35	75c	21	1.20
Alps.	50c	30c	60c	45c
Argenta.	50c	30c	60c	45c
Atlanta.	50c	30c	60c	45c
Aurora Tunnel.	50c	30c	60c	45c
Baltimore Con.	3.40	2.05	41	34.15
Belcher.	15c	14c	10	14c
Belmont.	15c	14c	10	14c
Best & Belcher.	15c	14c	10	14c
Bullion.	1.65	11	3	12.95
Bechtel.	11	1	1	70c
Belle Isle.	70c	60c	75c	70c
Bodie.	41	4.35	41	51
Bentley.	41	80c	1.15	1.10
Bulwer.	21	2.20	21	2
Boyle.	30c	25c	20c	50c
Black Hawk.	30c	25c	20c	50c
Belvidere.	30c	20c	20c	15c
Booker.	30c	20c	20c	15c
Caladonia.	45c	35c	70c	55c
California.	2	1.85	2.40	1.95
Challenge.	2	1.85	2.40	1.95
Chollar.	2.40	1.95	2.40	1.95
Confidence.	5	7	6	71
Con Imperial.	25c	20c	50c	35c
Con Virginia.	31	2.95	3.45	2.80
Crown Point.	1.60	1.15	1.40	1.15
Con Washoe.	35c	30c	35c	25c
Champion.	35c	30c	35c	25c
Concordia.	35c	30c	35c	25c
Dayton.	35c	30c	35c	25c
De Fries.	35c	30c	35c	25c
Danby.	35c	30c	35c	25c
Day.	40c	35c	40c	35c
Eureka Con.	151	151	151	151
Excelsior.	11	1.40	2.05	1.25
Endowment.	11	1.40	2.05	1.25
Gen Thomas.	25c	20c	25c	20c
Grand Prize.	12	12	12	1.80
Gila.	12	12	12	1.80
Golden Chariot.	12	12	12	1.80
Golden Terra.	12	12	12	1.80
Goodshaw.	11	95c	1	95c
Gold & Curry.	3.60	3	61	3
Hale & Norcross.	4	2.90	61	4.35
Hillside.	12	12	12	1.80
Highbridge.	12	12	12	1.80
Honesty.	12	12	12	1.80
Hussey.	12	12	12	1.80
Independence.	12	12	12	1.80
Julia.	12	12	12	1.80
Justice.	70c	60c	160	70c
Jackson.	70c	60c	160	70c
Joe Seaton.	70c	60c	160	70c
K K Con.	2.10	2	3.15	2.15
Kentuck.	2.10	2	3.15	2.15
Kosuth.	2.10	2	3.15	2.15
Keystone.	2.10	2	3.15	2.15
Lady Bryan.	2.10	2	3.15	2.15
Lady Wash.	2.10	2	3.15	2.15
Leopard.	2.10	2	3.15	2.15
Leviathan.	2.10	2	3.15	2.15
Leeds.	2.10	2	3.15	2.15
Lee.	2.10	2	3.15	2.15
May Belle.	2.10	2	3.15	2.15
Modoc.	2.10	2	3.15	2.15
Manhattan.	2.10	2	3.15	2.15
Martin White.	2.10	2	3.15	2.15
McClintock.	2.10	2	3.15	2.15
Meadow Valley.	2.10	2	3.15	2.15
Mexican.	2.10	2	3.15	2.15
Mides.	2.10	2	3.15	2.15
Morning Star.	2.10	2	3.15	2.15
North Con.	2.10	2	3.15	2.15
New York.	2.10	2	3.15	2.15
Northern Belle.	2.10	2	3.15	2.15
New Coso.	2.10	2	3.15	2.15
Nevada.	2.10	2	3.15	2.15
Occidental.	2.10	2	3.15	2.15
Opbir.	2.10	2	3.15	2.15
Oriental.	2.10	2	3.15	2.15
Overman.	2.10	2	3.15	2.15
Phenix.	2.10	2	3.15	2.15
Phil Sheridan.	2.10	2	3.15	2.15
Potosi.	2.10	2	3.15	2.15
Prospect.	2.10	2	3.15	2.15
Raymond & Ely.	2.10	2	3.15	2.15
Richer.	2.10	2	3.15	2.15
Rock Island.	2.10	2	3.15	2.15
Rye Patch.	2.10	2	3.15	2.15
Rough & Ready.	2.10	2	3.15	2.15
Savage.	2.10	2	3.15	2.15
Seg Belcher.	2.10	2	3.15	2.15
Sierra Nevada.	2.10	2	3.15	2.15
Silver Hill.	2.10	2	3.15	2.15
Silver King.	2.10	2	3.15	2.15
Silver Prize.	2.10	2	3.15	2.15
Succor.	2.10	2	3.15	2.15
Summit.	2.10	2	3.15	2.15
Swanton.	2.10	2	3.15	2.15
Solid Silver.	2.10	2	3.15	2.15
South Bodie.	2.10	2	3.15	2.15
South Standard.	2.10	2	3.15	2.15
Star.	2.10	2	3.15	2.15
St. Louis.	2.10	2	3.15	2.15
Syndicate.	2.10	2	3.15	2.15
Toga Con.	2.10	2	3.15	2.15
Tipton.	2.10	2	3.15	2.15
Trojan.	2.10	2	3.15	2.15
Union Con.	2.10	2	3.15	2.15
Utah.	2.10	2	3.15	2.15
Vermont Con.	2.10	2	3.15	2.15
Ward.	2.10	2	3.15	2.15
Wells Fargo.	2.10	2	3.15	2.15
Woodville.	2.10	2	3.15	2.15
White Cloud.	2.10	2	3.15	2.15
Yellow Jacket.	2.10	2	3.15	2.15

Sales at S. F. Stock Exchange.

Thursday A. M., Sept. 2.	AFTERNOON SESSION.
1145 Alta.	21/2 @ 2.65
140 Andes.	40 @ 1.20
165 B & Belcher.	111 @ 2.11
415 Belcher.	210 @ 2.10
550 Bentley.	130 @ 1.40
320 Con Virginia.	31 @ 1.35
50 Chollar.	40 @ 1.35
55 California.	210 @ 2.10
150 Crown Point.	2.20 @ 1.55
100 Con Imperial.	350 @ 1.40
110 O Dorado.	30 @ 1.35
185 Excelsior.	2.30 @ 1.55
230 Gold & Curry.	41 @ 2.40
5 Golden Gate.	330 @ 1.10
410 Hale & Norcross.	30 @ 1.40
500 Justa.	150 @ 1.35
50 Julia.	300 @ 1.35
100 Lady Wash.	350 @ 1.35
750 Leviathan.	250 @ 1.35
320 Mexican.	120 @ 1.35
130 New York.	250 @ 1.35
90 Opbir.	81 @ 1.35
50 Overman.	130 @ 1.35
160 Occidental.	110 @ 1.35
100 Orig Gold Hill.	210 @ 1.35
150 Potosi.	2.60 @ 1.35
700 Phil Sheridan.	250 @ 1.35
50 Quinn.	300 @ 1.35
50 Savage.	310 @ 1.35
45 Sierra Nevada.	31 @ 1.35
1065 Silver Hill.	350 @ 1.35
100 Senator.	10c @ 1.35
500 Scorpion.	2.05 @ 1.35
20 Union.	24 @ 1.35
100 Ward.	110 @ 1.35
20 Yellow Jacket.	180 @ 1.35

THE Duke of Portland has had a site prepared on one of his English estates for a beaver village for a number of beavers imported from Canada.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	13	50	Aug 2	Sept 29	W H Watson	302 Montgomery st
Alta S M Co	Nevada	13	50	Aug 2	Sept 29	W H Watson	302 Montgomery st
Andes S M Co	California	15	25	July 8	Aug 16	Butler Burris	309 Montgomery st
Blackhawk G M Co	California	9	20	July 29	Aug 26	H A Charles	419 California st
Belcher S M Co	Nevada	21	75	Aug 25	Sept 27	W H Crockett	327 Pine st
Bechtel Con M Co	California	6	25	Aug 11	Sept 17	J H Lent	309 Montgomery st
Booker Con M Co	California	6	15	Aug 10	Sept 16	W H Lent	309 Montgomery st
Bullion M Co	Nevada	16	100	Aug 16	Oct 4	J W Frazell	323 Montgomery st
Champion M Co	California	7	25	July 31	Sept 27	J W Crockett	327 Pine st
Chollar S M Co	Nevada	65	50	Aug 19	Sept 13	T V E Dean	309 Montgomery st
Con Imperial M Co	Nevada	12	10	July 15	Aug 19	W E Dean	309 Montgomery st
Con Pacific M Co	California	2	50	July 31	Sept 6	F E Luty	330 Pine st
Crown Point G & S M Co	Nevada	42	50	July 14	Aug 20	James Newlands	S F Stock Ex
De Fries M & M Co	Nevada	11	20	July 21	Aug 24	E C Masten	318 Pine st
Dudley M Co	California	9	25	July 10	Sept 15	C J Masten	309 Montgomery st
Equitable T & M Co	Utah	23	10	Aug 3	Sept 6	Chas J Collios	227 Montgomery st
Gen Thomas M & M Co	Nevada	6	50	July 20	Aug 24	Wm Willis	309 Montgomery st
Gould & Curry S M Co	Nevada	38	50	Aug 5	Sept 9	A K Durhrow	309 Montgomery st
Hale & Norcross S M Co	Nevada	65	50	Aug 5	Sept 9	A K Durhrow	309 Montgomery st
Julia Con M Co	Nevada	13	40	Aug 30	Oct 4	H A Charles	419 California st
Jupiter M Co	California	10	40	Aug 27	Sept 29	E C Masten	309 Montgomery st
Leviathan M Co	Nevada	11	15	July 21	Sept 21	P A Pristun	330 Pine st
Mackey G & S M Co	Nevada	4	15	Aug 6	Sept 7	J M Buffington	309 Montgomery st
Maryland Con G & S M Co	California	9	25	Aug 3	Sept 14	G F Farwell	302 Sansome st
Mayhew Con M Co	California	5	10	Aug 7	Sept 14	Wm J Taylor	310 Pine st
Mexican G & S M Co	Nevada	12	100	July 15	Aug 19	O L McCoy	309 Montgomery st
McCracken Con M Co	Arizona	5	40	June 26	Aug 4	A Vonzelburger	216 Sansome st
McFotol Con M Co	Nevada	4	15	July 30	Aug 21	E A Holmes	318 Pine st
Murphy G & S Co	California	4	25	July 13	Aug 12	S D Rogers	328 Montgomery st
Ophir S M Co	Nevada	37	100	Aug 26	Oct 2	C L McCoy	309 Montgomery st
Oro M Co	California	5	50	July 14	Aug 16	Wm Stuart	320 Sansome st
Prospect G & S M Co	Nevada	7	10	Aug 21	Sept 23	H P Bush	431 California st
Quinn M Co	Nevada	7	10	Aug 3	Sept 14	G W Elias	324 Pine st
Red Cloud Con M Co	California	8	25	Aug 17	Sept 23	W W Stetson	309 Montgomery st
Scorpion S M Co	Nevada	17	100	July 31	Sept 3	Geo R Spinney	310 Pine st
Segregated Belcher M Co	Nevada	62	200	Aug 25	Sept 24	C D Edwards	414 California st
Swamp Land S M Co	Nevada	62	200	Aug 25	Sept 24	C D Edwards	414 California st
Silver Hill M Co	Nevada	11	25	July 17	Aug 23	W E Dean	309 Montgomery st
Telfair M Co	Arizona	4	62	Aug 20	Oct 2	J Pentecost	702 Market st
Vortex M Co	California	1	05	July 12	Aug 16	G W Fisher	324 Pine st
Yellow Jacket S M Co	Nevada	33	100	July 10	Sept 16	Mercer Otter	327 Pine st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Amador Canal & M Co	California	3	100	Aug 13	Sept 21	R N Van Brunt	318 Pine st
California M Co	Nevada	2	02	Aug 17	Oct 11	A K Durhrow	309 Montgomery st
Eintracht Gravel M Co	California	5	100	Aug 24	Oct 1	E A Holmes	309 Montgomery st
Excelsior Deep Gravel M Co	California	12	10	Aug 4	Sept 6	H Kuntz	209 Sansome st
Gopher Con M Co	Dakota	1	100	Aug 11	Sept 16	D B Chisholm	327 Pine st
Holmes M Co	California	4	15	July 30	Aug 30	Theo Chisholm	404 Montgomery st
Headlight M Co	California	3	10	Aug 17	Sept 20	E A Holmes	318 Pine st
Iowa M Co	Nevada	10	05	Aug 4	Sept 4	W M Gillespie	414 California st
Mayflower Gravel M Co	California	8	10	Aug 26	Sept 30	J Morizo	328 Montgomery st
Peak Hill S M Co	Arizona	1	10	July 21	Sept 13	E T Bredes	224 California st
Quartz Mountain G M Co	California	4	09	July 30	Sept 6	E Bredes	729 Montgomery st
Richer M Co	California	5	05	Aug 4	Sept 8	Wm H Lent	309 Montgomery st
Rowe G M Co	California	1	10	July 8	Aug 7	S D Rogers	328 Montgomery st
Silveropolis G & S M Co	California	1	02	Aug 12	Oct 1	J H Mason	306 Pine st
Swamp Land G M Co	California	12	100	Aug 25	Sept 10	Chas W Badger	315 California st
Utah S M Co	Nevada	31	200	Aug 11	Sept 13	G C Pratt	309 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Arnold G & S M Co	—	A Judson	320 Sansome st	Annual	Sept 7
Corralito G M Co	—	R N Van Brunt	318 Pine st	Annual	Sept 6
Grand Prize M Co	Nevada	E M Hall	327 Pine st	Annual	Sept 21
Mayhew Con M Co	California	Wm J Taylor	310 Pine st	Annual	Sept 10
Northern Belle M & M Co	Nevada	Wm Willis	309 Montgomery st	Annual	Sept 13
South Standard M Co	California	C A Swickay	331 Montgomery st	Annual	Sept 13
Tascara M & M Co	Nevada	M E Sperring	309 California st	Annual	Sept 6

LATEST DIVIDENDS—WITHIN THREE MONTHS

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NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Consolidated Virginia M C	Nevada	A W Havens	309 Montgomery st	50	Aug 16
Eureka Con M Co	Nevada	W Traylor	37 Nevada Block	50	Aug 16
Peak Hill S M Co	California	Theo Widmann	404 Montgomery st	25	June 30
Grand Prize	Nevada	E M Hall	327 Pine st	25	Aug 21
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	10	Sept 1
New York Hill M Co	California	J B Leighton	527 Clay st	25	June 25
Northern Belle M & M Co	Nevada	Wm Willis	309 Montgomery st	50	Aug 16
North Belle Isle M Co	Nevada	E M Hall	331 Montgomery st	25	Aug 23
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	July 25
Western M Co	—	C S Curtis	309 Montgomery st	75	Aug 16

making its appearance again, and is looking very well, what there is to be seen. I will crosscut east and west immediately, and determine the size of the ledge on either side of the drift now run.

NORTH NOODAY.—The upraise being made from the 312 to the 412 levels is now 75 ft above the 312 level, and shows a large body of good milling ore. The 500 south drift is now 236 ft south of the crosscut; of this 18 ft was run during last week. The drift is in a large body of quartz.

PLACER.—The ledge continues strong and well defined, with the ore on the foot and hanging walls of excellent quality. There has been considerable increase in the amount of water coming from the ledge, but not enough to interfere with the work.

NOODAY.—The 212 south stopes have widened somewhat, both in the north and south end of the stope during the past week. The No. 2 north stope, 312 level, looks well. The south drift, 312 level, has been advanced 15 ft during the week; total length of drift, 750 ft. The stope on this vein is looking well.

BEVERLY.—There is no particular change to report in the different levels and stopes above and including the 650, and usual amount of ore (40 tons per day) is extracted and sent to the Syndicate mill.

COBENHAW.—They are drilling south at this mine along side the ledge, and taking out some good ore. In a few days it is proposed to crosscut the ledge, when the Goodwin may attract more attention than at any time in its history.

PLACER MINING.—Standard News, Aug. 29: But little placer mining is now being done on the eastern slope of Jodie ridge or on the flat beyond, but nearly all the ground in that locality has been located, and when the ledge is deep shaft down and its new and heavy pumping machinery in operation, and the Bodie-Mono shaft reaches the water level, and the Dudley pits in heavy pumping machinery, when all three of the mines named begin to pour heavy streams of water down over the rich placers of the eastern slope, there is no doubt but large quantities of gold will be extracted from the placer fields of Bodie—say early next spring.

LARK DISTRICT.—Mammoth City Herald, Aug. 21: The tunnels of the Mammoth are looking better now than at any period in the history of the workings of the mine. The true hanging wall has at last been found in the extreme south crosscut running easterly from No. 3 tunnel, at which point the ledge shows 20 ft in width with from 2 to 3 inches of clay selvage. The tunnel has been advanced 33 ft during the week, giving a total length of 1,293 ft. Tons of ore sent to the mill during the week, 461.

H. L. AND M. C. TUNNEL.—For the last 3 days the rock has been changing in character, growing coarse-grained and breaking handsomely. Distance run during the week, 23 ft; total length, 993 ft. This work may now fairly be said to be on the home-stretch, in good running ground.

LEWIS MINE.—Work has been suspended in this mine during the week, and all the force put to work on the adit to hasten its completion. Everything is now in place, the water turned on to the over-shot wheel, and the mechanics are engaged to-day in turning up the pulleys and making the connections. They expect to start up an regular business on Monday morning.

NEVADA.

ROCKY BAR MINE.—Nevada City Transcript, Aug. 27: A striking of 600 lbs of the rich ore recently found in the New Rocky Bar mine at Grass Valley was made Wednesday; 5423 ounces of amalgam was cleaned up from the battery and plates, and it is expected that there is enough more on the headings and pans to increase the amount to 600 ounces. H. L. Silvester owns about one-third of the mine. For 30 years he has been in business at Grass Valley, and invested a good share of his earnings in prospecting. This is said to be the first strike he ever made.

SAVING THE SILVER.—The Pioneer reduction works, under the supervision of Prof. H. C. and H. B. and H. C. and H. B. are being run to its full capacity on sulphurets from the Murchie and Morrill mines. A day or two since we saw a magnificent bar of silver which was the result of the working of the Murchie sulphurets. Our mining men are looking out for silver as well as gold, and find it quite profitable in saving the former.

ROUND MOUNTAIN MINE.—The entire force of employees at Round Mountain drift mine is busily engaged in breaking out about 75 carloads of good looking gravel per day. The last clean-up, made on the 1st inst., was satisfactory, considering the amount of dirt washed. Another clean-up will take place about October 1st.

NOTE.—About 75 ft east of the incline on the 120 level of the Mohican mine a 16-inch chute of rock that is heavy in sulphurets and shows some free gold has been developed.

MINES ON BEAR RIVER.—Grass Valley Union, Aug. 25: A company of Chinese is working the bed of Bear river just below the junction of Greenhorn creek with that stream. The stream has been turned over to the Nevada county shore and a large area of ground enclosed by an subankment, within which the pits are dug through the deposit down toward bed-rock and the pumps placed therein to pump out the water. The river bed is filled with deposits from the hydraulic washings to the depth of more than 20 ft, which necessitates the removal of a great deal of top dirt, which has to be wheeled out in barrows. There should be good pay at the bottom to pay for the large amount of dead-work required.

ROCKY BAR BONANZA.—Grass Valley Union, Aug. 25: The rich vein struck in the Rocky Bar mine last week shows no signs of giving out, although no pieces of extraordinary richness have been brought to the surface during the present week. The drifting has been going on. The ledge in the drift, however, shows well in iron ore. Besides more than \$5,000 worth that was crushed Wednesday, the company has yet on hand specimens to the value of \$3,000. All of this rock was taken out of the mine in 3 days, out of a space not exceeding 10 ft in length by 6 in width. The rich ledge is found 135 ft from the surface. Besides the strike in the west end of the Rocky Bar Co. have further to offer congratulation in finding a great improvement in the ledge at the bottom of the main incline (the Chavanne shaft) 450 ft deep, where the ledge in the drift shows from 24 to 30 inches, carrying well in sulphurets and yielding an average of \$30 per load. This good rock has been recently struck, and is the best rock yet found in the deep workings of the mine.

NEVADA CITY MINE.—Transcript, Aug. 23: All the stamps of this property have been running day and night since the latter part of July, when the number was increased from 5 to 10, and the average amount crushed daily is 18 tons. Stopping is going on in the 150 and 200 levels, the size and character of the ledge showing no material change since our last report. It is the intention of the management to begin next month to sink for a third level, the shaft not having been advanced any this summer.

SNEATH & CLAY MINE.—The Onida Old M. Co.'s agent here has received instructions to begin work on the Sneath & Clay mine about September 1st. It is to be hoped that the instructions will not be countermanded, as we have used to be considered a bonanza.

BEVERLY MINE.—Portland Tidings, Aug. 23: This mine has this week developed a 4-ft ledge of good looking quartz. The company intend thoroughly prospecting the mine and if this rock continues extensive operations may be looked for there.

YUBA MINE.—Reports coming down from Washington this week are to the effect that the Yuba quartz mine is looking well, and very well in fact, and the outlook for a permanently prosperous mine most promising.

NOTE.—Hydraulic mining all through the range from Dutch Flat up, and through this county, is having a longer water season than usual and paying well. The water bids fair to hold out until well along in September and some places later.

CONQUEST HILL.—North San Juan Times, Aug. 28: The shaft the Euro-Lako ditto company is sinking at the old town of Columbia Hill, is now down, as we are informed, 90 ft. The shaft is a very large one, 14 ft in length. It has 3 compartments, separated by strong and durable timbers. The process of sinking is naturally very slow. Blue gravel was struck at the depth of 60 ft, and

good paying gravel has been found from top to bottom of shaft. How much deeper the shaft will have to be sunk to reach bedrock can only be conjectured. The top of the shaft is from 150 to 200 ft lower than the original surface.

MADISON LAKE.—Grass Valley Union, Aug. 24: The Mohawk mine, in this district, continues to prospect well. We received a letter yesterday morning from Supt. Byrnes, in which he gives the most glowing accounts of it, and says it is bound to be a veritable bonanza.

PLACER.

LOWELL AND LIBERTY HILL NOTES.—Dutch Flat Forum, Aug. 25: We learn that the Planet mine has a tunnel in lora distance of more than 2,000 ft. The company will run a distance of 600 ft further when another incline will be made. The developments so far prove very evidently that a rich bed of gravel will be cut through in running the incline. Sound tests having gravel has already been found recently.

SWAMP ANGLE.—A large force of men is working this property. They also have 3 shifts of men on the new shaft, which is now down to a depth of about 75 ft. So far as can be ascertained by former prospects a good quantity of gravel will be opened up by this shaft.

DARBY MINE.—In this mine 10 men are being worked at the present time. The main tunnel is being run ahead, and there have every reason to believe good paying gravel will be struck at a distance of 300 ft, the distance decided upon to run in. This tunnel is being run in the bedrock close to the junction of the bedrock and gravel.

LITTLE YORK CO.—This company will shut down work for this season in their mine at Liberty Hill in about 10 days or 2 weeks, the water having run down to such an extent as not to be enough to work with. This company has had a good season's run and have taken out a great deal of gold.

GOLD RUN.—Cor. Auburn Herald, Aug. 28: Several claims, here and at the Flat, are still running with fair returns. The cement mill will soon be completed, when a revolution may be expected in mining affairs. At the quartz ledge half a mile below Old Run the owners are engaged putting up an adit for the purpose of thoroughly testing the rock.

DIAMOND MINE.—This property, situated 2 miles below Old Run, is being thoroughly prospected, an incline having been sunk to a depth of some 30 ft directly on the ledge. This ledge is looking well and shows good all through it. The ledge is 5 ft wide with streaks of red clay running through and parallel with the ledge. Gold can be obtained from every pan of this clay.

SHASTA.

IRON MOUNTAIN.—Bedding Independent, Aug. 26: The prospects of this district are improving. Senator Jones has put up \$1,000 to prosecute work on the Jones & Vanouy mine, and the latter gentleman, with Mr. Dervin, will commence work immediately. The location is considered by some to be the best on the mountain.

NOTE.—The tunnel on the Camden & Magee mine is being pushed ahead. They have struck soft rock and mud, and it is said the mud is stained with silver and will assay \$11 to the ton.

FREXET GULCH.—On the Scorpius mine they have struck water, and it will be necessary to build a bulkhead and run a drift to draw it off. It is reported that they have plenty of good ore in sight. A number of miners are employed and more are wanted.

SIERRA.

POVERTY HILL.—Downville Mountain Messenger, Aug. 28: From this property the owners divided a generous dividend this season. The rock mined in the handsome sum of \$45,000 last year. The ground enough left for an indefinite period. Their new tunnel is in 2,700 ft, and will reach the channel in about a year more, if not sooner.

HOG CANYON.—Parties are engaged in running a tunnel in Hog Canyon to strike the old Primrose ledge. The tunnel is started just back of the shaft house, and runs into the hill. It is now in some 40 ft, and is being vigorously pushed ahead.

COLD BLUFF.—We are informed that the Cold Bluff mine is being fitted up, and will be started in the near future. A great deal of work has been done to develop the mine during the past year. This property paid well for many years, until the upper levels were exhausted.

BRANDY CREEK.—This property, the Fairplay company has had a satisfactory clean-up. The Cleveland has done as well. Union Hill had a short water season, but realized large returns.

CORNCUT HILL.—The Celestials at this mining center are hydraulicking down a plentiful supply of nuggets and coarse gold.

RED YIELD.—Arnott & Baird's hydraulic claims, at Brandy Creek, have this season paid the lucky owners the handsome dividend of \$14,000.

NOTES.—The Virginia mine, at Howland Flat, was bonded last Tuesday to San Francisco capitalists for \$150,000. At Plum Valley, Nelson & Co. are making extensive preparations to run the Tippecanoe next season.

TUOLUMNE.

THE OLSEN LOBE.—Sonora Independent, Aug. 23: The company that is working the Olson mine, at Golden City, has traced the vein westward to a point 4 miles north-easterly from Knight's Ferry, a distance of 10 or 12 miles, where it has a force employed prospecting, and the results are most satisfactory. A number of tons of ore from the shaft have been tested, and have very promising returns. The ore is, in character, much the same as that at Golden City, which leads the company to believe it to be one and the same vein, considering its course and character. Thus may it naturally be inferred that there exists niles in extent of this mammoth quartz lode, upon which no claims have yet been located.

NOTE.—The vein is 1 mile or thereabouts, from the locality named, on lands owned by Samuel Dingley, and only a few rods from his dwelling house, the continuation of the vein is to be plainly seen in a trench some 3 ft in depth, washed out by the winter rains. Mr. Dingley, we understand, has already located and contemplates sinking a prospect shaft on the vein at some favorable point not yet determined upon definitely.

TRINITY.

NEW RIVER.—Weaverly Journal, Aug. 23: We learn that the New River hydraulic mining company has contracted for the building of the 9 miles of ditch and flume required to bring their water on to Hawkins' bar, for the sum of \$63,000. There will be about 5 miles of fluming on the route, and everything considered, the company has succeeded in letting the contract at a low figure. The work will make lively times in that section while it lasts.

NEVADA.

WASHOE DISTRICT.

SIERRA NEVADA.—Cold Hill News, Sept. 1: The mining situation has, in some respects, changed at the north end, where developments are soonest expected. Sierra Nevada is following ore south from crosscut No. 2, 2300 level, to crosscut No. 1, where 0 ft of ore were found. The north drift, 2500 level, is getting promising quartz already.

UNION.—Union is working hard, but has not yet reached the point where the chockholders believe it has grasped the mainline, winze No. 1 is sinking through low-grade ore for the 2000 level, and the shaft, when some law things are finished, will be sunk to that level also, and then the 2 workings will be connected.

ORION.—The heavy vein material which has been so promising in Ophir has been lost sight of late, but it is there all the same, and a drift on the 2500 level is following the trend of the vein. The work will carry the vein should that trend hold, fully 900 ft east of the Union shaft, and doubtless when time permits and opportunity presents a drift will be run in that direction in search of it.

BELOCHER.—The necessity which exists for Belcher's suspension of operations on the 3000 level just at this time, when the best level of connection on the 3000 level with Crown Point and necessary ventilation have been secured, is a little discouraging; but the delay of a month will quickly pass, and then the mine will be in condition to make up for lost time.

AURORA DISTRICT.

REAL DEL MONTE.—Esmeralda Herald, Aug. 21: Owing to the accident but little work was done in the mine the first of the week. Wednesday the new clack-chamber arrived and was put in place immediately. Thursday morning sinking was resumed. Everything is now working as smoothly as though nothing had ever happened.

THE PROSPECTS.—The Blasted tunnel is now about 230 ft in length and the work still going straight ahead. The face is still in blue porphyry. If some of the mine owners that are working tunnels over 200 ft in length with wheelbarrows would go and observe the manner in which the car comes out of the Blasted tunnel, we think they would discard the wheelbarrows and get cars.

GRAND TRUNK.—A new drift was started from the crosscut south and driven 20 ft, following a streak of yellowish looking ore that gives a very good prospect.

THE QUINCY.—Sinking on the ledge and taking out ore still continues. A depth of about 20 ft has been reached, and there is some 5 or 6 tons of ore on the dump. The ore was excellent on the very surface, and has been improving all the way down.

CENTENNIAL.—The working force has been increased, and the work of taking out ore progresses more rapidly. As soon as the little mill starts up, which will be probably the middle of next month, they will make a crushing.

MCLINTOSH & DARNES.—Messrs. McKinlay & Winters have cut between 4 and 5 tons of fine ore. There are 2 very rich streaks in the ledge, and the ore on the dump is taken from these streaks. A crushing will be made as soon as the mill starts.

BRISTOL DISTRICT.

DUNSTON CO.—Pioche Record, Aug. 21: The machinery of this company has been located, and everything worked like a charm. Arrangements for putting up a tank with a capacity for holding 60,000 gallons will be completed in a short time. The company has already put on teams hauling ore.

NOTE.—The Hillside company now employs 75 men at the mines and furnace.

COLUMBUS DISTRICT.

NORTHERN BELLE.—True River, Aug. 21: The lora-tion is still very hard. About midway of the 3d level, a crosscut was started in which some very fine ore has been found. The 1st and 3d levels look full as well as last week. There is no change in the levels above the adit. About 35 tons of ore shipped per day to Belleville, where the company's mills are situated. The bullion shipped up to Aug. 15th is \$76,973.71. Both mills and mine are running satisfactorily.

MOUST POTOMI.—At present 12 tons of ore per day are being taken from the mine. The No. 2 tunnel is being pushed ahead as fast as possible, with seams of ore all through the base of the drift. The No. 1 tunnel is being cast central drift in No. 2 tunnel was started with good ore in the face. This drift will open up their back ledge and cut it at a depth of 140 ft. The company has taken 75 tons of good ore from the croppers of this ledge, and expect to develop a good body of ore as soon as the ledge is cut.

VICTOR.—The company is shipping 23 tons of first-class ore per day to New Boston. The ore comes from the bottom of the incline 140 ft deep. The mill at New Boston will be started up on this ore in a few days.

BELENO.—A crosscut has been started south from the bottom of the incline, at a depth of 210 ft, to cut the ledge from wall to wall; the crosscut is in now 8 ft, and all ledge material.

EQUATOR & METALIC.—The shaft at the present time is down 350 ft, a distance of 65 ft having been sunk this week; the bottom of the shaft is in ledge material.

WINSTON.—The shaft has reached a depth of 140 ft and still in ore.

EUREKA DISTRICT.

RICHMOND COX.—London Mining Journal, Aug. 7: The manager reports that operations have been carried on with usual regularity. No. 14 chamber has considerably improved since last report. In the southwestern end a winze has been sunk in good ore to a depth of 30 ft, and promises to open to a good ore body. No. 15 is without any material change.

NOTE.—An important strike of ore is reported in the 500 level in a drift running parallel to the old workings in Dunderberg and Atlas ground. This drift is in entirely unbroken ground, and adjoins the immenso chambers of ore from which the parties previously in possession of the property obtained about \$750,000 net profit.

PROSPECT MOUNTAIN TUNNEL.—Sentinel, Aug. 23: Reports from this great enterprise are most flattering. The rate of the shaft is now in favorable ground for the existence of ore bodies.

GRANTSVILLE DISTRICT.

ALEXANDER MINE.—Belmont Courier, Aug. 21: This is one of the biggest mines in the State. The mountain seems to be nothing but ore. A ledge measuring over 450 ft in width, and prospected to a depth of 600 ft, is surely a bonanza for any camp. In all the levels the ore is of the same extent and character, and the indications are favorable for its going down to a great depth.

BRADLYN.—Hoisting works are going up on this mine. It promises to open finely, and the ore is of a high grade.

LUNDY DISTRICT.

MAY LUNDY M. CO.—Esmeralda Herald, Aug. 21: We learn from Mr. Z. B. Ravenel, who has just returned from this district, that he has contracted with the May Lundy mining company for the transportation of their ore from the mine to their proposed mill site. The mine is about 3 miles from the place selected to build the mill, which is to be erected immediately, and will be of a 10-stamp capacity. Mr. Ravenel describes the ore as being so very rich that you may take up a piece at random and find free gold. In fact, he says that it is the exception to pick up a piece that has not free gold in sight.

OSCEOLA DISTRICT.

OLD CHANNEL CO.—Cor. Ward Repter, Aug. 19: We are down 65 ft. Have passed through 45 ft of concrete or cement, and have come to what was known in California back channels as pipe clay. The clay is red and full of wash boulders. We get some small prospects of wash gold. Expect to sink at least 50 ft more before reaching bedrock. All are hopeful, and it is the general impression that something substantial will be struck.

PHILADELPHIA DISTRICT.

ELMONT.—Official Letter, Aug. 17: There is no material change in the mine. Ore stopes continue looking very favorable. Extracting about 10 tons of first-class ore per week, and 25 tons second-class ore per week. Air winze to north stope is completed, which gives good air in the stopes above 300 level. Have commenced getting rock and brick on the ground to put up the boiler for the concentration mill.

PIOCHE DISTRICT.

RAYMOND & ELY.—Record, Aug. 21: The personal property of this company was sold at Sheriff's sale last Saturday, and was bid in by the mortgagees. They are now in the state of liquidating the Raymond & Ely and Meadow Valley companies down at San Francisco, but are unable to come to an agreement.

DAY MINE.—Work in this mine progresses steadily and developments continue very favorable. Ore has been encountered in the drift run from the 400 level, the deepest workings in the mine, assays from which going as high as \$500.

REBEL CREEK DISTRICT.

QUARTZ DISCOVERY.—Winnemucca Silver State, Aug. 25: Another recent mining discovery in this district, 3 miles north of the Ohio mine, is attracting considerable attention. The new ledge is called the Iowa, and the locators have sunk a shaft to a depth of 25 ft on the ledge. The vein is between 7 and 8 ft thick, and the average assays of several pieces of the ore is \$274.37 in silver, and \$12.55 in gold to the ton. The highest assay obtained was \$2,000 to the ton.

SPANISH BELT DISTRICT.

BARCELONA.—Official Letter, Aug. 18: Since my last report we have advanced 12 ft in north level through a

splendid ledge of high-grade ore, with walls perfect. Have been forced to turn all hands on upraise, so as to push it to completion as soon as possible. I am short of good miners and air very close. Have advanced 15 ft in upraise and hope to make connection soon.

SPRING VALLEY DISTRICT.

PLACER MINES.—Winnemucca Silver State, Aug. 26: We learn from Mr. Peter Spray, of this district, that the Eagle mill is shut down for nearly a year, and the work is suspended in the mine on account of the high water. He says that about 100 Chinese are working in the placer mines near the Eagle. They hoist water out of shafts on quartz mines to wash the gold-bearing gravel. Sometimes, in fact quite frequently, they make as high as \$100 a day to the hand in washing the gravel.

WHITE PINE DISTRICT.

TRENCH MINE.—News, Aug. 25: We learn from this Superintendent that the recent strike in the Trench was made in shaft No. 2, 30 ft below the surface. The shaft has been sunk 5 ft lower, and the ore appears to be coming in strong. It is of the same character as the rich ore formerly taken from the Trench—black auriferous.

FEATHERSTONE.—An important strike has just been made in this mine, lying back of the town. The ore assays up in the hundreds.

BADGER STATE.—This mine, on White Pine mountain, has a shaft down 95 ft. They have a good body of ore, in which gold predominates.

WILLOW CREEK DISTRICT.

A RICH STRIKE.—Paradise Reporter, Aug. 21: We are pleased to record another rich strike at Willow Creek. The ledge has been struck in the Iowa Co. claim, and carries ore that assays from \$305 as high as \$3,300 in gold and silver. These are assays from the surface only, but the mine is being actively developed by 2 shifts of men and presents a very encouraging appearance. From the valuable mineral deposits that have been discovered in the vicinity of Willow Creek, it is safe to predict prosperous times for the district.

ARIZONA.

SILVER DISTRICT.—Cor. Phoenix Expositor, Aug. 18: We have had no rain for nearly a year, and the tanks at the Klara camp are the only ones containing water in the district. No scarcity at the mines, however, as they are abundantly supplied by teams and burro trains, from the river, 5 miles distant.

SILVER MINE.—The quarrying on the surface of this mine continues, the ore becoming richer as they enter the mountain. This is the only silver quarry now being worked, to my knowledge, in the mining world, and would repay a visit. Eight assays of ore taken at random from the dump yielded from \$112 to \$2,407 of silver per ton, and a per cent. of lead ranging from 24 to 78.

NOTES.—The Iron Cap is sinking away, and have opened on a handsome and heavy seam of metal on the foot wall. The Chicago Co. has 14 lodes in this camp. It will open up from the rain comes.

MILK MOUNTAINS.—Tombstone Nugget, Aug. 10: Encouraging reports continue to arrive from this district. Their enormous ledges are showing up better than ever in width and value per ton. Ben Johnson's claim, called the Lillie, shows a 25 or 30-ft vein, assaying about \$100 to the ton, while Foley & Egloff property is showing equally well. A recent blast in the Copper Queen works is said to have laid down a ledge, where it can be conveniently handled, hundreds of tons of ore, and leaving exposed such a body as had not been seen before.

CHARLESTON DISTRICT.—Among the mines which are assuming importance is the Lizzie, situated about 11 miles this side of Charleston. The developments consist of a shaft 55 ft deep showing a fine vein of extra high grade ore. From this shaft a long drift is to be run, following the ore body.

NOTE.—News from the Dragons give big finds and some of our citizens have gone out to get their fingers into the silver pit.

GLOBE DISTRICT.—Silver Belt, Aug. 21: The Independence mine, about 7 miles north of Globe City, exposes an ore body of 3 to 5 ft, with argente walls, in which silver can be seen in its native state. There has been a large amount of ore taken from this mine in the month of July, with satisfactory results, besides a lot milled, which gave a return of 290 ounces per ton.

STONEWALL MINE.—This mine is about 2 miles east of Globe City, and has a vein ranging from 0 to 25 ft wide, the ore averaging about 60 ounces per ton.

COX & CORLIN.—About 8 miles north of Globe, and near the Independence. At the surface the vein varies from 12 to 30 ft wide, but at a depth of 100 ft it shows the enormous width of 60 ft. The ore milled from this mine gave a yield of \$400 per ton, while assays made from the surface to the present depth of tunnel on main ledge, ranged from 100 ounces per ton to almost pure silver.

COLORADO.

CLARK CREEK COUNTRY.—Colorado Miner, Aug. 21: The lessees on the Colorado Central lode, who are drifting west from the bottom of engine shaft No. 2, have struck a very rich streak of ore composed of ruby silver and gray copper running up into the thousands. The pay streak will average 6 inches in width.

COST LOBE.—Another rich strike was made in this lode, on Brown mountain. The ore runs very high and carries a great deal of ruby silver and gray copper.

Snowdrift Co.—This company, which recently commenced work upon their property on Republican mountain, have struck a fine body of ore in the lowest drift upon the Daniel Peters lode, which assays between 700 and 800 ounces of silver per ton.

SNEVELY LOBE.—This lode, on Brown mountain, still continues to produce its full complement of ore. The last assay was as follows: First class, 475 ounces; second class, 450 ounces. Last month there were 13 tons of ore shipped from this mine.

SENKA LODE.—This lode, on Sherman mountain, is developing finely. The ore vein is continuous, and averages from 2 to 4 inches, which assays from 130 to 1,500 ounces, and mill runs: First class, 620 ounces, and the second class, 380 ounces.

RED BOTTLE LODE.—Georgetown Courier, Aug. 10: A rich strike has been made in this lode on Red Elephant mountain. They have from 12 to 18 inches of ore carrying carbonate of copper that assays from 2,000 to 2,500 ounces of silver per ton.

IDAHO.

LEMMU COUNTY.—Yankee Fork Herald, Aug. 21: The work of developing the Badger mine will be carried forward all winter. A tunnel is to be run to cut the ledge at a depth of 300 ft below the present workings. The mine is opened by a 90-ft shaft, from which a west level is extended a distance of 240 ft, all the way through good ore. The vein is 4 ft in width; the first-class ore samples over \$1,400 per ton; the second class, \$800 to \$700; and the third class about \$150.

CUSTOM MILL.—J. Sharon has his 10-stamp custom mill on the road between Challis and this place. He has purchased Matt. Bray's mill site, at the mouth of Jordan creek, a quarter of a mile above town. The pans and settlers have been ordered from Virginia City. It is the intention to have it running in 6 weeks.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department No. 10, San Francisco:

VULCAN CON. M. CO.—Location: Nevada. Capital, \$10,000,000. Directors—A. F. Benjamin, F. Sperling, Geo. T. Knox, T. D. Olmstead and M. E. Spang. He has purchased Matt. Bray's mill site, at the mouth of Jordan creek, a quarter of a mile above town. The pans and settlers have been ordered from Virginia City. It is the intention to have it running in 6 weeks.

POTOMAC M. CO.—Location: Nevada county, Cal. Capital, \$100,000,000. Directors—L. R.

The Inter-Oceanic Ship Railway.

[CONTINUED FROM PAGE 145.]

provements should be referred not to those who are merely skilled in the use of tools, but to those who understand and can analyze and demonstrate the principles involved; and those schemes that will not bear this scrutiny should be left alone.

We ask legal advice, not from the copyist in a law office, but from those familiar with Coke, Littleton, Blackstone and modern lights in the science of law. We seek medical treatment, not from the mere compounder of drugs, but from those whose course of study and knowledge of therapeutics show them to have been diligent students of medical lore. We send our watches for repairs to no blacksmith, however skillful. Do we trust our engineering to other than engineers. This is the California practice, with few exceptions. Physicians who would not treat an opulent patient for smallpox without a good round fee—lawyers who charge \$5,000 for conducting an important suit in court—Presidents of banks and other institutions receiving \$10,000 to \$20,000 per annum for their services, trust engineering enterprises upon which their fortunes are dependent to men willing to work for \$50 or \$100 per month rather than employ a respectable engineer who will not degrade his profession by working for nothing unless circumstances compel him to do so. These gentlemen see the force of our reasoning in their own cases, but usually learn only by dear-bought experience, its application to engineering. Now all this is so apparent when attention has once been called thereto, that we fear the public will be tempted to say, "We knew all this before." Then, will it permit us to inquire, why has it not governed itself accordingly?

Usually too cautious thus to expose itself, the unprogressive element to which we have referred occasionally ventures upon what bears the semblance of argument. Just now it is dilating in private circles upon the ruinous strains to which it asserts that ships would be subject on a railway.

This plea is so plausible on its face, and seems so reasonable to the unprofessional mind, that it makes no little impression, and is freely and very properly offered rather as a suggestion than otherwise, by many intelligent gentlemen who are by no means to be confounded with the unreasoning or unprogressive element of which we have been speaking. Hence it merits respectful consideration and courteous answer.

On the 31st day of December, 1870, a paper was communicated to the Royal Society giving the first exact and really scientific treatment that many of the problems relating to the strains upon ships had ever received, and clearly showing the errors of previous theories. Unable to recall where we had seen this paper, and not sure of the author, for the purpose of showing the foregoing objection to be unsound, we divided the hulls of several vessels of modern construction into transverse sections, represented by the vertical lines *v*, fig. 1, and calculated the weight of hull and equipment and the buoyancy of the divisions between these lines, which gave us the excess of weight or buoyancy of each division, and enabled us to compute the still-water strains upon any part of the hull of each ship so treated, and approximately the strains upon the crest of waves and in the trough of the sea. To illustrate our figures, we prepared several diagrams, in each of which the still-water load-line of the vessels are shown by the lines *c*, *c*, *c*, and the wave crests and hollows by the lines *o*, *o*, *o*; and to avoid the confusion of intermingling lines, we prepared separate diagrams for each of the latter. Since making these calculations, which were exceedingly tedious, we have found reprints of parts of this paper in Vols. 1, 2, 3, of *Naval Science*. It was written by E. J. Reed, C. B., Vice-President of the Institution of Naval Architects; Member of the Institutions of Civil Engineers, and of Mechanical Engineers; honorary member of the Liverpool Literary and Philosophical Society; author of "Ship-building in Iron and Steel," "Our Iron-clad Ships," editor of *Naval Science*, and late Chief Constructor of the navy, the authority quoted by Captain Eads, and justly termed by him "perhaps the first authority in the world upon all matters relating to ships." Retaining our own diagrams, slightly modified for the purpose, we substitute his ships and the strains given by him in lieu of our own, that the startling figures developed by these calculations may have the authority of his great name. Those interested in such matters are referred to his exhaustive article, for it contains much of interest foreign to the purpose of this paper, and we have space to handle only a few of his results and these in the briefest manner.

Let fig. 1 represent the royal yacht *Victoria and Albert*. This is given by Mr. Reed as a representative of the long, fine, fast paddle-steamers used for pleasure, for blockade-running, or passenger traffic, without much freight. Starting at the bow, where the weight is in excess, and proceeding aft, with gradually increasing buoyancy, we find 50 ft. from the bow a transverse section *a*¹, where the weight and buoyancy are equal. This is termed a water-bourn section. Continuing aft, with still increasing buoyancy, at a point about 68 ft. from *a*¹ we find another water-bourn section, *a*²; 82 feet further aft a third, *a*³; and 70 ft. further—30 ft. from the stern, the aftermost water-bourn section, *a*⁴.

The weight in front of the first water-bourn

section exceeds its buoyancy by 85 tons. Between *a*¹ and *a*² the buoyancy exceeds the weight by 225 tons; between *a*² and *a*³, where the boilers, engines and coal are situated, the weight exceeds the buoyancy 210 tons; between *a*³ and *a*⁴ the buoyancy exceeds the weight 130 tons, while aft of *a*⁴ the weight exceeds the buoyancy 60 tons. This distribution of weight and buoyancy we have graphically represented in fig. 2 by cutting out of the vessel those portions where the weight exceeds the buoyancy and suspending in lieu thereof, and at the center of gravity of these sections, the shaded squares representing the excesses of weight, the sum of which equals the sum of the excesses of buoyancy. These weights at the ends produce what are termed hogging strains, which, but for the sagging strain produced by the weight amidships, would find a single maximum hogging moment near the middle of the length. But, in consequence of this sagging strain, there are two maximum hogging moments, the first and greatest between *a*¹ and *a*², about 86 ft. from the bow, where it amounts to 5,080 foot-tons. The minor maximum hogging moment falls upon the buoyant section between *a*³ and *a*⁴, and is considerably lighter. About 30 ft. of the midship section is subject to a sagging moment, the maximum value of which is only about 170 foot-tons, though the excess of weight over buoyancy is 210 tons. A small change would convert this sagging into a hogging moment. Let 4 tons of this weight be moved 150 ft. to the front, and 6 tons carried 100 ft. aft, the hydrostatic equilibrium of the vessel is unchanged; but this change of weight would produce a hogging moment of 600 foot-tons, which, combined with the sagging moment of 170 foot-tons previously existing, would leave as a final result a hogging moment of 435 foot-tons at the point where the sagging moment of 170 foot-tons had previously existed. This shows how seriously a vessel may be strained by an improper disposition of the cargo. It shows, also, that an excess of weight amidships does not necessarily involve a sagging strain, for, after these changes, there would still remain an excess in weight of 200 tons. And again, it shows the necessity of taking into account all of the forces acting upon one side of the section for which the bending moment is being calculated; as, unless this is done, it is impossible to determine whether sagging will take place or not, for the hogging moment due to the unsupported weight at the extremities will often more than counterbalance the sagging due to excess of weight amidships, as well as the converse.

We will now suppose this vessel to be balanced upon the crest of a wave of its own length, 300 ft., and 20 ft. high, fig. 3. At the bow the excess of weight is now 220 tons, and at the stern 185 tons, while the former deficit of buoyancy amidships of 210 has become an excess of 405 tons. The hogging strain of 5,080 has now risen to 16,400 foot-tons, or more than three times that of still water, and its maximum moment has shifted from within less than 90 ft. from the bow to near the middle of the vessel.

When this vessel floats in the wave hollow, fig. 4, the strains brought to bear on her are very remarkable. The still water excess of 210 tons' weight amidships now reaches an excess of 785 tons. The excess of weight at the ends has changed to an excess of buoyancy of 390 forward and 395 tons aft. The result of this is to produce sagging moments throughout the entire length, increasing as we recede from the ends, and reaching its maximum near the middle, where it amounts to 31,000 foot-tons, more than six times the bending strain in still water.

Fig. 5 illustrates the disposition of weight and buoyancy on the wave crest, of the *Bellerophon*, "an ironclad of moderate length and proportion, with central batteries, armor belts and fall-back stern." The advantage of this bow in giving increased buoyancy is shown by the fact that the foremost water-bourn section *a*¹ is only 40 ft. from the bow, and the excess of weight on this length is only 45 tons in still water, though it amounts to 445 tons when the ship is balanced upon the crest of a wave of its own length and 20 ft. high. The aftermost water-bourn section is about 50 ft. from the stern, and the excess of weight on this section in still water is about 220 tons, reaching 555 tons upon the wave crest. This ship has a still water excess of weight amidships of 250 tons, and yet no sagging at any point. On the wave crest this 250 tons still water excess of weight became 1,000 tons excess of buoyancy, and the maximum hogging moment reaches 43,500 foot-tons, or 3½ times that of still water, and falls very near the middle of the ship, whereas in still water it falls considerably abaft the midship section.

The 1,000 tons excess of buoyancy amidships on the wave crest changes to 1,240 tons excess of weight in the hollow of the waves, Fig. 6, while the excess of 445 tons weight forward, and 555 aft, change, respectively, to no less than 640 and 600 tons excess of buoyancy. The maximum bending (sagging) moment is 48,800 foot-tons—about 4 times the maximum bending (hogging) moment in still water, and about 5,200 foot-tons greater than the maximum hogging moment on the crest of the wave.

The *Minotaur* is armored throughout its length, and is a fair representation of extremely long, fine ships so protected, with V-shaped, transverse, vertical sections at the bow. Her length is 400 ft. The heavy weights of engines, boilers, coal, water, powder and provisions are distributed over a considerable portion of its length; the guns are also distributed along the

broadside, and the weight of the hull is nearly uniform except at the extremities."

"In this ship there are only two water bourn sections, *a*¹ and *a*². The first is about 80 ft. from the stern, and before it the weight exceeds the buoyancy by about 420 tons. The second is about 70 ft. from the stern, and on this length there is an excess of weight of about 450 tons; between *a*¹ and *a*², a length of 250 ft., the buoyancy exceeds the weight by the sum of these excesses, 870 tons."

"This ship is subject to hogging moments at every transverse section, gradually increasing in amount from her extremities toward the middle of the length and obtaining their maximum value near the midship section (240 ft. from the bow), where it amounts to 45,000 foot-tons." At *a*¹ the hogging moment is about 19,000, and at *a*² 20,000 foot-tons. The bending moments due to the longitudinal pressure of water against the sides of this ship have a maximum value of 3,700 foot-tons. The maximum bending moment due to vertical bending force has been given as 45,000 foot-tons, or about 12 times as great.

On the crest of a wave 400 ft. long and 25 ft. high this ship has an excess of weight forward of 1,275, and aft of 1,365 tons; with an excess of buoyancy amidships of 2,640 tons; its maximum bending (hogging) moment in this position, Fig. 7, is 143,300 foot-tons, or about 8 tons per square inch of iron section.

In the wave hollow, Fig. 8, instead of 1,275 tons excess of weight forward and 1,365 tons aft, we have 655 and 695 tons respectively, excess of buoyancy, and, instead of 2,640 tons excess of buoyancy amidships, we have 1,380 tons excess of weight. This gives a maximum bending (sagging) moment of 74,800 foot-tons, or a little more than one-half the maximum hogging moment on the wave crest. The transit of waves 400 ft. long is 8.85-100 seconds. In one half this time we may suppose this ship to have passed from wave crest to wave hollow during which she has been wracked from stem to stern by these enormous and rapidly-changing strains, her maximum bending moment passing from 140,000 foot-tons hogging to 74,800 foot-tons sagging strain, and as her downward course is suddenly checked, as she settles in the trough of the sea, these strains are vastly increased. When we try to combine with these the strains exerted by the wind and sails and leverage of masts, by the rolling and pitching and tossing of the vessel and the mighty blows of ocean waves, the problem becomes too intricate for finite intelligence ever accurately to solve. But when we consider that the engineer is able approximately to calculate and to control these mighty forces—to build his ships to stand the storm, to drive them swiftly, safely, unerringly against wind and wave, through fogs and midnight darkness and the howling tempest, across vast oceans to their destined ports at the appointed time—we are proud for that grand profession whose triumphs are dotting the ocean and changing the face of the globe.

The weight of ships, until launched, rests almost entirely upon the keel. We learn from Mr. Reed that the iron ship *Prince of Wales*, when being launched, stopped and remained for some time with her bow resting upon the edge of a wharf, her stern being supported by the water. Though thus suspended by the extremities, no damage took place. The wooden line-of-battle ship *Cesar* stopped on the launching ways at Pembroke in 1853, and remained for 17 days with 64 ft. of the stern unsupported by ground ways. This caused a drooping of 2 ft. in 90. In 1866, the iron-clad frigate *Northumberland* stopped, when being launched, with 52 ft. of the after part unsupported, and remained so for 30 days. The weight of the unsupported part was about 450 tons, and the momentum of this weight at the point of support 11,700 tons. The result of this strain was a deflection of 7-16th of an inch in a length of 342 ft., which was reduced to 5-16th when the ship was floated.

It is obvious that in a strong cradle, supported by numerous wheels upon the smooth, even, rigid bed of a 12-rail roadway, no ship could be subject to any such strains as those we have been considering, and we dismiss this question without further comment.

A few words more and we bring this somewhat rambling paper to a close. We have by no means taken up the advocacy of the railway in opposition to the canal. We have been an interested advocate of the latter for years; have studied all the surveys and reports; carefully examined all the maps, charts, estimates and plans, and our preferences have always been largely in favor of the Nicaraguan route. But, in the few remarks made by Capt. Eads before the Chamber of Commerce, there is food for much reflection. The fact that he advocates the railway, should bid us pause. Engineers do not lightly hazard an opinion. Of all men, they are usually the most cautious. From want of efficient data, they sometimes doubt the success of schemes that are subsequently carried into successful operation, but in the things they do endorse there is little room for doubt, for they take nothing upon trust, but deal solely with facts and figures. Either of these schemes is of the greatest importance. Either in successful operation would be far reaching in its results, effecting for good or ill the commerce of the world—the welfare of our race. They merit, therefore, the best thoughts, not only of engineers, but of philanthropists, financiers and statesmen. Capt. Eads' views have been before the world long enough to have received careful consideration. It is not easy to see how his

conclusions can be avoided. If there are those who can successfully controvert them, they are strangely tardy in making it known. If any there are who can point out a serious objection, they have not yet spoken, while in a matter of such world-wide importance, silence on the part of such persons is almost a crime.

The writer has expressed himself somewhat freely in this paper, but having always the courage of his opinions, he seeks no shelter behind an editorial impersonality, and therefore subscribes himself,

A. B. BOWERS, Engineer.

From Vera Cruz to Mexico.

Starting from the sea shore and directing his course inland, the traveler finds, as he proceeds, that he is gradually rising through the different gradations of the torrid zone and entering upon temperate latitudes. This he can at once detect from the decreasing heat, and, more particularly, from the change in the style of vegetation which surrounds him. A run over the railroad from the Gulf port of Vera Cruz to the city of Mexico is a revelation to the intelligent stranger. This is the only completed line of railroad in the republic. The distance between the two points is about two hundred and sixty miles, the run being made in a little over eighteen hours. There is probably no road of equal length in the world upon which the traveler can pass so rapidly from torrid to temperate zone—from the region of the palm to that of the pine—and through so varying a panorama of wonder and beauty, as upon this Mexican road. Leaving the hot, fever-ridden sea coast at Vera Cruz, where death and the black vomit have maintained a reign of terror since the landing of the first Spaniard, your car rolls westward for a couple of hours over a level sand plain, covered with low, dense vegetation, interspersed here and there with giant trees, many of them leafless and apparently dead. The huzzard, or sopilote, as the natives call him, loves these solitudes, and countless numbers of them are forever perched along the naked limbs, or flapping curiously past your car window. From this low plain the road gradually emerges, the country begins to roll a little, the foothills draw near, the vegetation takes on another tinge and form, and before you can fully make up your mind to the change you are skirting the banks of a limpid stream, with picturesque hills on either side. The ascent is now rapid, and a charming panorama of mountain, stream and canyon, with occasional glimpses of the Gulf of Mexico in the distance is before you. Your car is headed bravely for the heart of the Cordillera, which rises blue and mysterious far above you; and now and then, as you twist and curve about the canyons, glimpses may be had from the car window of the white cone of Orizaba, which lifts its pale tip up so close to Heaven that the Indians call it the Mountain of the Star.—D. S. Richardson in *September Californian*.

FAILURE OF THE LIVADIA'S STEEL BOILERS.—Those engineers who hold that steel is not a good material of which to make boilers, will find support for their opinions in the failure of the boilers of the Czar's yacht *Livadia*. This vessel was to have had eight main boilers of steel. Six of these were finished and ready for hydraulic test of 150 lbs. per square inch. On the pump being set to work the first boiler split through the cold steel plate, the longitudinal crack being about three ft. long, the pressure reached being 140 lbs. The whole of the boilers were, we understand, thereupon condemned. It was determined, however, to proceed with the test, and three more boilers were easily burst with pressure varying, we are told, between 80 and 140 lbs. The plates were of Cammell's steel. This experiment will go far to cause the total rejection of steel by shipowners as a material for boilers. It is also stated that experiences recently acquired are all against steel as regards the durability of furnace plates, and some eminent marine engine builders will not employ it on any terms.—*Iron Age*.

A CHEAP HAMMOCK.—Take a piece of Manila matting from two or three yards long and a yard and a half wide, hind or bend the ends firmly, then fasten each end to a piece of timber. These pieces should be 5 ft. long, 2 inches thick, and should have holes bored about three inches apart the whole length. The matting is fastened by passing heavy twine from matting to hole, hack and forth, really sewing the matting to the wood. For each end of the piece of wood larger holes are bored, through which pass ropes to hang the hammock between two trees. This makes a cheap, comfortable and safe hammock. Being hung from four corners there is no danger of rolling out, and half a dozen children can swing in it at pleasure.—*Journal of Chemistry*.

A COLORADO PHENOMENON.—A large tidal spring has been discovered about six miles from Rico, says the *Gilpin county Register*, which is a curiosity. The spring is about 25 ft. in diameter. In the morning it is brimful of water and at evening it is perfectly dry. The water is remarkably clear and cold. It effervesces constantly, as do all the numerous springs in that neighborhood.

TO MAKE SELF-SHARPENING HORSESHOES.—Self-sharpening horseshoes are made by the simple expedient of rolling a steel plate in the center of the iron from which the shoe is made, so that the calks of the shoe have a hard steel center, and as the soft iron wears away by use the sharp steel is left to prevent slipping.

Vertical vs. Inclined Shafts.

Our correspondent, Mr. Frederick M. Amelung, in a recent letter, when speaking of a certain mine, made use of the following expression: "A new inclined shaft, following the dip of the vein, has been started." It is my opinion that this is false management, since the vertical shaft would answer the purpose far better, be free from water, and enable the mine to be worked in a systematic manner." Whereupon a correspondent in the *Silver World* of July 10th becomes indignant, and writes to that paper, saying that inclined are better in all respects than vertical shafts, and summarizes their advantages as follows:

"Any miner of Capt. Cruse's experience knows full well the superior value of inclined shafts for operating on fissure veins which have a dip, both for economy and systematic working, for the following reasons:

"First—An inclined shaft follows the course of the lode and proves its value as depth is gained, and not infrequently mineral is found in such quantities as to pay the whole cost of sinking, and in all probability the Ule shaft will be found to do, thus saving great expense to the owners.

"Second—All the cost of driving crosscuts to intersect the lode as in the case of vertical shafts is saved.

"Third—An inclined shaft being on the vein, as soon as deep enough, stations can be cut, levels can be extended, and thus the mine can be systematically and expeditiously developed.

"Fourth—The cage or bucket, as the case may be, for hoisting, comes down directly to the stations, flats or levels where the mineral is broken, thus obviating the necessity of taking the mineral in cars through long crosscuts to a vertical shaft.

"Fifth—It gives far better ventilation and air to the mine.

"Sixth—There is no more water than in a vertical shaft.

"Seventh—The inclined shaft can be sunk to a great depth and yet be in proximity to the lode; whereas, in a vertical shaft, as depth is gained, it departs from the vein until further operations prove impracticable."

Where the object of work is to explore a vein, especially in a new district, and where time is limited, there can be no question but that the incline following the lode is the most advantageous. As the vein is usually wetter than the country-rock, the incline on the vein is generally more troubled with water than the vertical shaft; but when it comes to permanent work (not exploration), the greater speed with which hoisting can be done in a vertical shaft, the less length required to attain a given depth, and consequently the less amount of columns, pipes, pump-rods, guides, rope, etc., required, are all in favor of vertical shafts. The great variations in the dip of a vein at different points is but one of the difficulties met with in making an incline on the vein a convenient shaft for permanent work. But a simple reference to Comstock practice—unquestionably the best in metal mining in this country—and the more and more general adoption of vertical shafts in the place of inclines in the anthracite coal mines, where a single shaft will turn out 1,500 to 2,000 tons in 10 hours' work, shows the practical recognition of advantages of the vertical shaft over the inclined one for regular work. This, however, does not affect the claim for superior economy and speed in exploring a vein by adopting an incline instead of a vertical shaft. So that each has its appropriate place, and neither is the best under all circumstances. —*Engineering and Mining Journal*.

THE DESTRUCTION OF GAME FOOD.—So long as America continued in the occupation of the aborigines, the order of nature was apparently but little disturbed. The buffalo and deer, the wild fowl and turkeys, furnished abundant food to the savages without serious encroachment upon the fertility of nature. In savage life there appears to be no wanton or unnecessary destruction of the natural means of support. It was reserved for the civilized white man to carry on wanton against this bounty of nature, and to kill and destroy, without thought or study of those imperative laws under which nature holds in trust, the food supply of man. From the first settlement of this country, the process of eradicating and annihilating the useful animals, birds and fishes natural to the country has been carried on with an energy and success, but too characteristic of the Saxon race. Large tracts of land have been entirely depopulated of their animals and useful birds. The buffalo on his native plains has become an object of rare curiosity. Deer are limited to the remotest mountain ranges or extensive tracts of barren woods. The wild fowl which swarmed in New England during the first settlement of the country, and for a long time afterwards, have almost disappeared. The last wild turkey was killed in Massachusetts nearly half a century ago. There is probably no sportsman living who has killed a grouse on Martha's Vineyard, the last refuges in the northeast of that most valuable bird. Plover still migrate, though in diminished numbers, from their breeding places in the far North to their winter homes in the South, but they carefully avoid the northeastern coasts. No one in this generation has seen a wild swan alighting on the waters of Massachusetts. They once abounded there. Even the wild geese find no resting place there, but are expelled as if they were tramps and vagabonds. —*International Review*.

USEFUL INFORMATION.

"Neptunite," the New Cloth Preservative.

The invention—already noticed in these columns—of a new compound to be applied to clothing, feathers, silks, etc., to render them capable of defying any injurious action from water, ink, lemon juice, coffee, etc., seems to be creating quite a stir in New York. It is claimed that the inventor's assertions as to its remarkable qualities were fully carried out by experiments recently made, and at which Mr. Thurlow Weed and a number of press representatives were present. The solution is said to be very rich in solids. By heating this solution until it changed into a gas and then placing in it the goods to be operated upon, every fiber of the material became saturated and coated with an elastic layer of the solution, which is wholly impervious to water. This coating is light, impervious and elastic, and strongly resists all the elements which tend to destroy fabrics. It gives a supple body and elasticity to the goods, and prevents all absorption of water. Yet the goods are not vulcanized, for they may be boiled without affecting the coating upon the fibers. The goods are rendered neither air-tight nor water-tight, but simply water repellent. Fabrics treated with this solution are unaffected by any stains, and even resist the action of acids.

During the experiments above alluded to a stream of water was directed first upon a carpet and then upon a piece of broad dress goods without "wetting" it. A gentleman's silk hat was dipped into the water, and cups of water were afterward poured upon it, but the silk was not disturbed. The experiment was greeted with great applause. It was followed, however, by one which quite overshadowed it. Two ladies' hats, so beautifully and delicately constructed, were subjected, flowers, laces and all, to the same ducking that had been bestowed upon the gentleman's hat, and yet no difference in their appearance could be detected. Ostrich feathers were dipped into the tank without even changing the curl in the feathers. Kid gloves and finally a number of ribbons were all successfully tested. Having finished with the water, lemon juice, coffee, claret and finally ordinary writing ink were poured upon the fabrics, without affecting them in the slightest degree. The ink rolled around upon a piece of pink silk like little black beads. The different liquids broke into little globules and rolled about upon the goods like mercury on a piece of glass. The inventor said that every effort had been made to do away with the coating after it had been formed, and that such efforts had proved unavailing. It made goods wear longer, and prevented silks from wearing "shiny."

A NOVEL ICE MACHINE.—A correspondent at Council Bluffs sends to the *Scientific American* a refreshing account of a car which came in on the Chicago & Northwestern railroad, the axle laden with icicles several inches long and the running parts covered with solid ice, which had formed there with the thermometer at 86° in the shade. The mystery is soon solved when he tells us that the car was loaded with gasoline, which was leaking through the bottom of the car. Gasoline, being extremely volatile, of course evaporated with great rapidity, and thus produced, as every volatile liquid does, a diminution of temperature, a principle made use of in all ice machines. The production of ice by the evaporation of gasolins, remarks the editor, is not so rare as our correspondent supposes. A harrel of gasoline exposed to the air on a warm summer day frequently has a crust of ice or snow around the bung and wherever any escape of the gasoline can take place. A current of air blown over the surface of a volatile liquid causes it to evaporate more rapidly, and in the case mentioned above such a current was caused by this motion of the train. As soon as the surfaces were cooled below the dew point, moisture from the air began to be deposited, which was frozen when the temperature reached 32° Fahr.

TO MAKE TEST PAPER.—The *Electro-Metallurgist* says that a useful test paper may be made by boiling one pound of leaves of the red cabbage in one pint of water for some time, and then straining the blue liquor through muslin. Evaporate to about half its bulk; place layers of white blotting paper in the liquid, and then hang them up to dry. Acids change the blue color of the paper to red, and alkalis turn it green. This is a very good substitute for litmus paper.

CAREFUL PRINTING.—In an article comparing American wood engraving with English, the *London Examiner* says, that if printed "with extraordinary care, on heartily prepared paper," some of the "blocks in English magazines would equal those which now appear in *Scribner*." It attributes more than one-half of the success of the wood cuts in *Scribner* to the printing and paper. This printer of *Scribner* is Mr. De Vinne, who is author of a "History of Printing."

IMPROVED BLEACHING PROCESS.—An improvement in the process of bleaching vegetable fibers has been made, which is said to consist in adding margarine, stearic, or oleic acid, or the mullage of flax or Panama bark to a hazy bath of alkali, or chloride of lime. This, it is claimed, limits the destructive action of the chloride, and promotes the solution of the gummy and resinous matters that adhere to the raw fiber,

VARNISH FOR FOUNDRY PATTERNS.—A varnish for foundry patterns and machinery has been introduced in Germany, the advantages claimed for which are that it dries as soon as put on, gives the pattern a smooth surface, thus insuring an easy slip out of the mold, and prevents the patterns from warping, shrinking or swelling, as there is perfect imperviousness to moisture. The preparation of this varnish consists in placing in a vessel 50 lbs. shellac, 10 lbs. Manila copal, and the same quantity of Zanguibar copal. This is heated by the external application of steam for four or six hours, being stirred in the meantime constantly. There are then added 150 parts of the finest potato spirit, and the varnish heated during some four hours to 190 Fahr. This liquid is then dyed by the addition of orange color, and can be used for painting the patterns. When used for painting and glazing machinery, the varnish may consist of 35 lbs. shellac, 5 of Concorial copal, 10 of Zanguibar copal, and 150 parts of spirit.

RED PRINTING INK. according to the *Engineer*, may be made in this way: Boil linseed oil until smoke is given off; set the oil then on fire and allow it to burn until it can be drawn out into strings half an inch long; add one lb. of resin for each quart of oil and one-half lb. of dry, brown soap cut into slices. The soap must be put in cautiously, as the water in the soap causes a violent commotion. Lastly, the oil is ground up with sufficient pigment on a stone by means of a miller. Vermilion, red lead, carmine, Indian red, Venetian red and the lakes are all suitable for printing inks.

NICKEL is said to be more infusible than iron, more malleable, more ductile, tougher, and quite unaffected by atmospheric influences. M. Fleitmann has found that when melted it absorbs some carbonic acid, and if a small quantity of magnesium is then added, the metal becomes remarkably ductile and malleable. It can be drawn out into very fine wire, or beaten into extremely thin leaves, and can readily be welded either to nickel or iron.

A DOOR standing open, which would readily yield on its hinges to a gentle push, is not moved by a cannon ball passing through it. The hall in passing through, overcomes the whole force of cohesion among the atoms of wood, but its force acts for so short a time, owing to its rapid passage, that it is not sufficient to affect the inertia of the door to an extent to produce motion.

GOOD HEALTH.

Bad Water as a Cause of Disease.

A correspondent of the *Scientific News* says: "It is not strange that doctors and old women believe that fevers are produced by drinking what is supposed to be unwholesome water. Any absurdity will be generally believed whenever it has been preached enough. And the bad water theory has been preached from generation to generation, perhaps from Adam's time down to date.

"Doctors frequently examine water with a microscope and see small 'dangerous' animals in the water, and report this fact with the bad cases of sickness 'thus produced' to medical journals, who innocently publish it all, and, without considering the fact that, with the same instrument, they can see as many animals in any and all water that healthy people drink.

"Now, the facts are, that any person may drink their fill out of any stagnant pool of swamp water with tadpoles, animalcules, lizards and all, without receiving any injury therefrom, simply because the stomach has a way of disposing of the animals; but the lungs have not. Hence, persons should cease to breathe while drinking. The lungs may inhale more than what can expel.

"The water was no worse while all Memphis was having the yellow fever than at any other time, and had nothing to do with producing the fever. While the prairies of Illinois were being broken, the people had more fevers per acre than in any other country, simply because there was more vegetation per acre rolled under to rot and poison the atmosphere; and, during the prevalence of fevers in Illinois, the water was no more dangerous than now.

"There are no fevers or agues in any country where the soil is generally poor, no matter what can be seen in the water.

"I believed the bad-water theory until I commenced to run a pump factory, which gave me an opportunity to know what people had in their wells. I did not need the microscopes to see the slippery remains of dead toads, snakes, poisoned rats, skunks and woodchucks. Some people had a well and privy in a back yard, some respectable distance apart on top of the ground, but they were practically all one thing in the same strata of gravel at the bottom. I expected to see the people get sick (as they should) from using such water; but never knew of a case of the kind, which shows that people may live healthy on pure air and horribly bad water."

The editor of the *Scientific News* comments on the above as follows: "Our correspondent is at fault in his assumption that visible organisms, dead or living, in water, are supposed to be a cause of disease. The poison of typhoid or of yellow fever is no less a poison because invis-

ble, and the former, at least, has been as distinctly proved to be carried by infected water as the poisons of yellow fever has been proven to be transported in clothing."

Spread of Disease by Earthworms.

Recent researches by M. Pasteur appear to throw considerable light on the origin of anthrax, or aplenic fever, and allied diseases, which attack cattle, sheep, etc. (If animals, why also may not man be seriously affected by the same mode of spreading other disease germs?) When an animal dies of anthrax it is not uncommonly buried on the spot. The conditions of putrefaction prove fatal to the small parasitic organisms, or bacteridium, which is abundant in the blood at death. The gas given off causes it to break up into dead and harmless granulations. But before this can occur not a little of the blood and humors of the body have escaped into the ground about the carcass, and here the parasite is in an aerated medium favorable to the formation of germs. These corpuscular germs M. Pasteur has found in the soil, in a state of latent life, months and years after the carcass was buried, and by inoculation of guinea pigs with them, has produced anthrax and death. Now it is especially notable that such germs have been met with in the earth at the surface above the place of burial, as well as near the body.

The question arises: How came they there? And it would appear that earthworms are the agents of conveyance. In the small earth cylinders, of fine particles, which these creatures bring to the surface and deposit after the dews of morning or after rain, one finds, besides a host of other germs, the germs of anthrax. (The same process was proved also by direct experiment; worms kept in ground with which bacteridium spores had been mixed were killed after a few days, and many of the spores were found in the earth cylinders in their intestines.) The dust of this earth, after the cylinders have been disintegrated by rain, gets blown about on the neighboring plants, and the animals eating these thus receive the germs into their system. It is suggested that possibly other disease germs, not less harmless to worms, but ready to cause disease in the proper animals, may be in like manner conveyed to the surface in cemeteries. The *Scientific American* suggests that this should also furnish a fresh argument for cremation. The practical inference as to anthrax is, that animals which have died of this should not be buried in fields devoted to crops or pasturage, but (wherever possible) in sandy, calcareous ground, poor and dry—unsuitable, in a word, for worms.

The value of the eucalyptus in allaying the unwholesomeness of the malarial districts is very positively affirmed in a recent number of *London Nature*. The testimony in support of the efficacy of eucalyptus in this respect, the writer asserts, are too convincing to be doubtful. In malarial districts, where the fever-tree abounds, fevers are unknown, and in Algerian Corsica, where the experiment of planting the trees on the strength of their reputed virtues was systematically made some years ago, malarial fevers have entirely disappeared. From Algeria, especially, the evidence of its virtues is very convincing. Consul Playfair reports, for example, that large tracts of land have been transferred by the agency of the fever-tree, and that, wherever it is cultivated, fevers are found to diminish in frequency and intensity. M. Gimbert recently made a report of like tenor to the French Academy. The pestilential district about the city of Rome, known as the Campagna, had, until lately, a world-wide reputation as a veritable hot-bed of deadly fevers. It is now affirmed to have vastly improved in wholesomeness, in consequence of the presence of large numbers of eucalyptus introduced some years ago by order of the Italian government.

SINGULAR EFFECTS OF NITRO-GLYCERINE.—A correspondent of the *British Medical Journal* gives, in the case of a lady suffering with cramps in the stomach, something less than a drop of a 1% alcoholic solution of nitro-glycerine. In two minutes the pulse fell from 140 to 50; a clammy sweat covered the patient's features, and she became senseless. Stimulants to the nose and brandy were quickly given, and in about three minutes more she began to recover. The pain was completely gone, and did not return all that night or the following day. The patient said she felt like two people, and so strong was this impression that, though perfectly rational in her conversations and unexcited in her manner, she could not shake it off, but frequently checked herself when about to make allusion to her imaginary double.

MEAT FOR INVALIDS.—The following is a good method of rendering raw meat palatable to invalids: To 8½ oz. raw meat from the loin, 2½ oz. shelled sweet almonds, 17 oz. shelled bitter almonds, and 2½ oz. white sugar—these to be beaten together in a marble mortar to a uniform pulp, and the fibers separated by a strainer. The pulp, which has a rosy hue and a very agreeable taste, does not at all remind one of meat, and may be kept fresh for a considerable time, even in summer, in a dry cool place. Yolk of egg may be added to it. From this pulp, or directly from the above substances, an emulsion may be prepared, which will be rendered still more nutritious by adding milk. A small quantity of wine or tincture of cinnamon may be added, if desired.



W. B. EWER.....SENIOR EDITOR.

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The Week.

Since our last issue there has been a noteworthy occurrence in the arrival at this port of the *Ho Chung*, a Chinese steamer. She is a small craft of British build, and one of some 30 steamers, most of which are larger than the *Ho Chung*, owned by a Chinese company. On entering at the Custom House the steamer had to pay an extra duty of 10% on her cargo and an alien tonnage tax of \$1 per ton. She brought a few white passengers and only seven Chinese.

Recently the State Board of Equalization gave notice that it intended to raise the valuation of real property in this city 10% over the county assessment. Against this contemplated increase, the Board of Supervisors promptly protested; for it is the prevailing belief among our citizens that the assessment is now quite high enough. It is stated further, that an advance of 25% throughout the State is meditated by the Board of Equalization.

The visit to this city of the President of the United States will be an interesting event. His reception and entertainment will be participated in by the great body of our citizens. It will be arranged by a committee of 200 citizens, selected equally from the great political parties; and from this General Committee there will be selected an Executive Committee to carry out the details of the reception. A special train will fetch the President here on the 8th inst. Gov. Perkins will welcome the Presidential party at the State line. On the 9th inst., the anniversary of our admission as a State, President Hayes and Gov. Perkins will be received at Oakland. And later, the President will receive the congratulations of his fellow citizens at the Palace Hotel.

The Industrial Exhibition is now in its fourth week, and has been a fine success. The coming week will be the most interesting period of the fair, and the concourse of visitors will doubtless be largely increased. Among the many notable features of the exhibition, the display of mining apparatus is the most conspicuous. Our mining machinery is unrivalled, and it challenges the admiration of every intelligent visitor. To those interested in the great industry, that exhibit of machinery alone is worth a week's attention.

Women as Insane Asylum Physicians.

Hitherto we have assigned to women certain positions in society, and have questioned the wisdom of any change. If they failed to fill their places creditably, there has been no hesitation to tax them sharply for their incompetence. It was conceded that everything was possible for man; but woman's capacity was apparently gauged at the beginning, and metes and bounds were fixed as the limits of her progress. This assumption of inferiority has grown out of the belief that her intellect is less profound than man's, and that she is more uniformly ruled by feeling, and is more impulsive and less reflective. Grant that this assumption is true: yet this very difference in mental and physical qualities, this apparent weakness, constitutes at once woman's grace and strength. Her tenderness, her devotion, her patience, her large sympathies, and her instinctive love of good—which is usually her equivalent for right—spring from these minor differences of sex. Fortunately there is a tendency to give to woman an opportunity to change and enlarge her scope of usefulness. If her sentiments respond to some necessity of her condition, it dictates ought to be respected. By all means give woman a chance to broaden her sphere of active and useful duty. At the best she is heavily weighted in the race of life. It ought to be the duty of man to see "that not another grain is piled upon that load beyond what nature imposes; to take care that injustice is not added to inequality."

We make this plea in behalf of the employment of women, who have been trained as physicians, in asylums for the insane of their sex. The number of women who have had a special training in some approved system of medication, is growing constantly; and their practice, we may remark, fully establishes their fitness for the general business of the physician. The care of insane women in hospitals and asylums, which has long been left to women attendants under the supervision of men, is coming to be under the supervision of women also. Only a short time ago a paper in Chicago published a list of six hospitals, most of them large establishments, where one of the assistant physicians is a woman; and in one of them, the new Eastern Pennsylvania hospital, Dr. Alice Bennett is to have the entire medical direction of the women who are patients. Another woman, Dr. Mary A. Cleaves, of Davenport, Iowa, has lately been appointed to take charge of the woman's half of the old State asylum at Harrisburg, in Pennsylvania. It is said that the masculine superintendents shake their heads at these radical innovations, and hint that they may be compelled to leave; but, as the *Springfield Republican* remarks, the common-place wisdom of the old judge who decided that "a man should not blow out his candle till he got his hand on his night-cap," is still in force among men in office. Of the entire fitness of Dr. Cleaves for the appointment there is ample testimony. A correspondent of the *Chicago Tribune* says of the lady: "Dr. Mary A. Cleaves for three years was assistant physician in the hospital at Mount Pleasant, Iowa, and since has been an efficient member of the board of trustees for the same institution. Last year she read a paper before the conference of charities in Chicago, which was commended for originality of thought and practical ideas." And the *Davenport Gazette*, the chief journal of the city where Miss Cleaves has been in general practice, and where her hospital record is well known, bears this testimony to her qualifications:

"Little if anything can be added to the wisdom of the choice thus made. Here in Davenport Miss Cleaves has the confidence of every one, and the profound respect of her associate physicians. Her ability is recognized, and her work in the practice of her profession has been followed with pronounced success. In the wider field to which she has been called, opportunity will be given for the full range of her talent, which amounts to genius."

There are, of course, great difficulties in the positions in which these women have been placed, and too much must not be expected from them at once. It has been confessed that the most experienced physicians know little enough about "ministering to a mind diseased," little enough about insanity on its most important side, that of cause and recovery. Time and experience, and study will complete the fitness of women for the delicate and responsible duty. In the meantime, there can be no reasonable objection it seems to us, to the employment of women in asylums and hospitals devoted to their sex. The presence of a woman would help greatly to engage the confidence of her stricken sisters, and her womanly intuitions would more readily perceive the cause of the malady, and suggest the proper treatment towards a cure. Cases may be imagined where such a result would be impossible in the hands of the most accomplished physician of the other sex. The subject of employing women in the care and treatment of the insane of their own sex is worthy of serious consideration; and we hope it will receive such humane and intelligent thought here in California as elsewhere.

WYOMING has a population of 21,900. In 1870 it was 9,276.

More Thorough Work.

The managers of mining property in Bodie are doing more thorough work. At first, it would appear, their means for developing their mines were altogether inefficient; but, after several years' discipline in the hard school of experience, they are beginning to learn to adapt efficient means to proposed ends. In relation to this subject the *Free Press* says: A year and a half ago the writer advocated the immediate erection of heavier machinery for the Bodie mines. Enough was determined to warrant such conclusions. Except in the case of the Standard, nothing of the kind was done, and even that company confined this new addition to a pump. During all this interval, however, work has been retarded because of the hoisting power being out of proportion to the demands upon it. So much ore has had to be raised, aside from the waste rock, that the engine is all the time over-taxed. But for this it is safe to say that the 1000-ft. level would have been far advanced in exploration, instead of the shaft dragging along about the 900-ft. station. The Bodie and Mono companies lost a year's valuable time fooling with expensive steam pumps. One year ago stocks were up, and the work of collecting assessments was an easy matter as compared with the present times, so that a grand opportunity was lost by not taking time by the forelock. Other companies are in the same dilemma regarding depth or the want of it, and the means and machinery to effect it. Fortunately the Noonday stepped in with a solid proposition for the south end of the district, and at the eleventh hour the Bodie and Mono start in to do what should have been inaugurated two years ago, when the big boom in the history of the district was all the rage and sensational dividends were in order. If the Standard can manage to drain the north country to 1,000 or 1,200 ft. deep, until the Bodie-Mono gets down accordingly, all may be well with several other important enterprises in the neighborhood. Fortunately the Noonday-Red Cloud operation has 400 ft. of depth to begin with, so that it will not require so long a time to get extensive pumping facilities quite below any and all present depths at the south end.

COMPETENT ENGINEERS WANTED.—It has been the common practice to speak of the fatal disaster which occurred in the Hudson River tunnel, by which the lives of 23 men were sacrificed, as an "accident;" whereas it was undoubtedly caused by the incompetence of those in charge of the work. It is safe to assert that that reckless and wicked drowning of unsuspecting workmen would never have occurred if the work had been under the direction of an experienced and skillful mining engineer. That tunnel, remarks the *Engineering and Mining Journal*, though an important work, and requiring the exercise of engineering experience and skill in its construction, is not one which necessarily involves great danger to the workmen engaged in it. From its inception, the work appears to have been directed by wholly inexperienced persons; and the same may be said of the efforts which have been made since the so-called accident to recover the bodies of the unfortunate men, or to make the connection between the tunnel and the shaft. It is the plain duty of the directors of the Tunnel company to secure a conference of competent engineers to examine and report upon the plans which have been proposed for completing the work, in order that a repetition of the late fatal blunder may not happen.

WOOD RIVER, IDAHO.—Mr. Thomas Allen, who has lately returned from Idaho, informs the *Territorial Enterprise* that the Wood River region is all the rage up that way at present among prospecting miners. He says the new mineral belt is some 75 miles in length, by 35 to 40 miles in width. While in most of this region the veins contain base metal or smelting ores, there is one section, at what is called Saw Tooth, where free-milling ores are found. There are now in the country some 3,000 people, who are divided up among half a dozen camps, generally dignified with the name of "city," as Jacobs City, Galena City, Saw Tooth City, etc. Up that way they think they have a wonderful mine if they have a shaft down 80 or 100 ft. Most of the shafts are but from 15 to 50 ft. in depth. Several of the galena veins yield from 200 to 300 ounces of silver to the ton. Many Salt Lake men are interested in the Wood River mines; also, a considerable sprinkling of miners from Nevada and California.

A PLENTY OF MONEY.—In the whole history of Portland, says the *Portland (Oregon) Bee*, no such accumulations of money were ever seen as at present fill all depositories. Every bank is deluged with coin and greenbacks, and on good security any amount is obtainable at 10% per annum. Borrowers are, however, not plentiful, as most of the improvements in progress are conducted by those who have the means to continue them without being obliged to borrow. Notwithstanding the increase in the price of material, there are fully as many buildings in course of erection this year as there was last at the same time.

A New Industry.

There is no place in the world, probably, where there is so great a consumption of what are known as "high explosives," as on this coast. Powders of this character are used in all of our mining operations very extensively, both in quartz and gravel. The explosive which will produce the greatest effect with the smallest labor or time employed in boring holes to rcsolve the same, is that which is demanded by the miners. When tonite was brought out in Europe the reports from it were such as to attract the attention of capitalists here, and the well known mining engineer, Hamilton Smith, Jr., went to England to investigate the subject. He was abundantly satisfied that the claims made for the explosive were sustained by the facts, and on his return he made a report on the strength of which "the Tonite Powder Company" was organized in this city.

The company have now begun to take active steps toward manufacturing the new explosive. Very extensive works are now in process of construction at Stage station, on the Northern railroad, between Berkeley and San Pablo, at which point there is a convenient place for a wharf on the bay shore. The buildings which are being erected, are of an entirely different character from those usually put up for powder works, being of a substantial and durable character, the company having confidence that they are in no danger from explosion.

The Risdon Iron Works are now building the machinery, consisting of an 80-horse power engine, centrifugals, pressing machine, etc. There is a good deal of machinery required, and it will cost upwards of \$50,000. They will soon be going ahead full blast, and have their powder on the market.

The process of manufacturing is essentially different from that of the nitro-glycerine compound. In them a day will finish a batch of powder. It takes a week before the entire process of manufacture of tonite is completed. Tonite has proved truly very successful in England, and is spoken of as "the explosive of the future." Its great points are its increased strength, absence of fuses non-liability to freeze, and its safety from explosion.

PLACER MINES AT MEADOW LAKE.—For some time there have been rumors of the existence of placers at Meadow Lake, in Nevada county, and of their successful working by a party of Italian miners. The *Nevada Transcript* has endeavored to trace the rumor to a trustworthy source, and has learned that while a party of men from Truckee was at Meadow Lake it met a number of Italians, who, on being questioned, stated that for several years they have been engaged in placer mining at a point near the line of Washington township, from which they had realized large pay. The water supply was meager and the season of work short, but the men appeared to be well satisfied with the results of their labor. Beyond this statement nothing further has been learned respecting the existence of placers in that district.

IMPRISONED IN A MINE.—Day before yesterday, about noon, says the *Enterprise* of August 24th, the giraffe got off the track of the incline at the Hale & Norcross mine; and got so wedged in against the timbers that it could not be moved. There were 20 men on the 2400 level that had gone down at 7 o'clock in the morning, who were left without means of reaching the surface, except by climbing the incline. About 2 o'clock yesterday morning 17 of the number performed this feat, climbing up to where they could go out to the Chollar-Norcross-Savage shaft, but there being a very hot place to pass through, three of the men would not undertake the trip, but remained below until the giraffe was again put in motion, which was about noon yesterday. It was not so hot below as to in any way injure the men, but their position was a very uncomfortable one during their imprisonment.

LARGE FOREST FIRES.—According to the *Shasta Courier*, the great fire which has been raging between here and Clear creek for several weeks past, still continue its ravages, filling the atmosphere with a dense smoke. Parties who are cutting wood this side of Clear creek state that the fire is set out and kept going by parties whom they cannot get sight of. While these wood-cutters were at dinner last Saturday a fresh fire was started by some unseen person near their wood, and they had hard work to keep their camp and outfit from being consumed. A close watch and bullets from a rifle may reveal who it is that spreads the fire.

THE Manchester *Guardian* is informed by its London correspondent that Herbert Spencer, the eminent scientific and philosophic writer, intends next year to make a tour round the world by way of the United States and Japan. He will devote two years to it, taking sociological observations at the more important points on the route. One or two scientific friends and one of his secretaries will accompany him on the tour, which will be the immediate preliminary to the completion of his philosophical system as originally planned.

The Mears Chlorination Process.

The new chlorination process of J. Howell Mears, M. D., is alleged to be the result of years of study and experiment on gold-bearing ores, especially on those classed as refractory sulphides. Ores of this character have been reduced by this process for some two years with such success that the resulting tailings contain nothing of appreciable value; and the yield of bullion is frequently equal to the value of the ore as determined by fire assay. It is pronounced to be an improvement on the older and approved processes of chlorination, including the Plattner; for it not only gives the best result in one-tenth of the time required by the latter process, but it does so at a small cost. Dr. Mears maintains that the advantages of his improved process have a wide application, and that it will largely supersede amalgamation in all gold quartz mining. It obviates the large loss of fine or "float gold," which is inseparable from amalgamation, and it has overcome the chief obstacles to the use of previous processes of chlorination by lessening the expense, and reducing the time to the minimum. That these obstacles have been overcome by the process of Dr. Mears has been demonstrated on a working scale in several mills. These repeated demonstrations have perfected the detail and determined the practice of the Mears process; and now that invention may be said to give assurance of a new departure in the methods of obtaining the gold from refractory sulphides.

The Plattner process, the merits of which are great, is too well known to require further mention. The Mears improvement—indeed, it is called the "Mears-Plattner process"—derives its specific character from compressed chlorine in a revolving cylinder containing the gold-bearing roast-mass. The advantages claimed for this improvement are: 1st, expedited action, by which time is greatly reduced; 2d, contraction of the operating area and appliances, giving economy in material, in hauling, and in the outlay for plant; and 3d, a close, indeed a closer extraction of the metal than is obtained by the older process according to Plattner. Following is a concise description of Dr. Mears' system:

1. Chlorine is generated in the usual manner by sulphuric acid, peroxide of manganese, and common salt, or, if preferable, by hydrochloric acid and manganese. The generator of the ordinary construction, and of a size proportioned to the work proposed.

2. A gas-holder, or gasometer of metal, properly protected and of moderate size, is used, as like tanks for illuminating gas, and for a like purpose, as a magazine to hold a constant supply.

3. Connection pipes of lead intermediately connecting a specially-devised force pump with the gasometer and a strong reservoir, into which the force pump compresses chlorine to the required degree of pressure, thereby also obviating the necessity for a large gasometer.

4. Connecting pipes, adjustable to a cylinder of iron lined with lead, the cylinder revolving on trunnions centered on the heads, and resting in boxes firmly seated on the iron frame support, one trunnion being hollow, to which the connecting pipe is adjusted. Central on the periphery of the cylinder a manhole fitted with an adjustable cover. All assailable parts protected with sheet lead, and the parts firmly bolted together, and capable to resist a pressure much greater than the working maximum, and indicated by an attached pressure gauge.

5. Filtering vessels with prepared bottoms, transportable on wheels, into which the chlorinated charge is dumped from the cylinder, water added, and from which the liquid or solution containing auric chloride is filtered or leached out until a test shows no trace of gold.

6. Vessels or receivers for the solution and for precipitating according to the method practiced.

Having established this complete plant, the operation of chlorination is carried out as follows:

1. A charge, consisting of 2,000 pounds dead-roast, is put into the cylinder, and to this 125 gallons of water added. The thorough mixing is then effected by revolving the cylinder. After having exhausted the atmosphere, to prevent adulteration of the chlorine, the charge of chlorine from the pressure reservoir is admitted until the gauge indicates the required density. The chlorine is then shut off, and the cylinder kept revolving from 30 to 60 minutes.

2. The chlorine having by this time thoroughly dissolved the gold in the dead-roast, the excess of gas under pressure is allowed to pass off either into the gasometer for re-use, or into a newly-charged cylinder to chlorinize another ton of dead-roast. The gas remaining in the water, held by absorption, is expelled or drawn off by means of a vacuum produced by adjusting the connections with the pump. The chlorination being finished and surplus gas discharged, the whole contents are run into leaching vats.

3. The leaching is finished when the liquid no longer shows a trace of auric solution in the sample tested.

4. This solution is then ready for the precipitating agent. If the sulphate of iron, it is added until a test sample shows no discoloration on adding a few drops of the sulphate. If charcoal, this auric solution is run through harrels properly filled with carbon, two or more being

used for absolute security that the whole of the gold has been deposited.

5. In this first case the precipitate is washed, some sulphuric acid being used to clear it of contaminating matters, and then smelted into an ingot with borax, etc. Or, in case carbon is used, the rich gold concentrate is dried and incinerated, the ashes washed out, and the gold smelted as in the previous case.

By following these simple, progressive and systematic operations, the entire contents of the numerous dead-roast are extracted and put in the form of bullion; and if the operations have been conducted with this care that the process demands and makes easy, there will scarcely be a trace of gold left in the concentrates, certainly not over 50 cents a ton. In an establishment where several tons of dead-roast are worked continuously, only, or mainly, that chlorine absorbed by the water is wasted.

The first consideration in this process of chlorination is a perfect roasting of the mineralized ore. The furnace formerly preferred was a modified construction of the reverberatory, in

Vast Importance of the Cotton Crop.

Mr. Edward Atkinson, a most competent authority on matters relating to political economy, says that the present cotton acreage of the Southern States covers less than 2% of the cotton-growing area of the United States; and that we do not begin as yet to appreciate the magnitude of the wealth to be obtained from the culture of cotton in this country. He estimates that the present crop of cotton will be at least 25% larger than the largest crop ever raised by slave labor—that is, it will exceed 6,000,000 bales. That amount of cotton, he says, will produce 3,000,000 tons of seed, over and above that needed for planting, which will yield 90,000,000 gallons of oil, 1,300,000 tons of mill-cake, and 1,500,000 tons of hulls suitable for making paper. Each ton of oil-seed meal will keep five sheep six months. Thus the crop of cotton seed will not only support mil-

Tea Culture in the United States.

By the efforts of Gen. Le Duc, Commissioner of Agriculture, tea culture in this country is coming upon a more promising commercial basis than ever before. The distribution of tea-plants from Washington has proceeded for a number of years and small samples of tea have been made in California and in some of the Southern States. There has been so much talk about tea and so little sewing-circles timber really produced that tea culture as an industry for this country has been looked upon by many as a sort of an industrial chimera. Since Gen. Le Duc has taken the subject in hand it must be acknowledged that tea growing has assumed more features of practicality.

We have just received from the East reports of an interview between a newspaper writer and the Commissioner of Agriculture upon the return of the latter from a visit to the tea plantations in the Southern States; and to illustrate the interesting statements which we have to make, we give an engraving of a young plant, leaf, stem and roots.

In his review of the history of tea growing in this country, Gen. Le Duc said that probably the largest number of plants collected by any one person are those collected by a Dr. Jones in Liberty county, Georgia, near Savannah, who some time before the rebellion undertook to raise a number of plants with a view of making tea. His plantation was practically abandoned, and after this war his daughter, Mrs. Scraven, prepared tea in a rude way from leaves picked from the trees. When, as Commissioner of Agriculture, I wished to promote the cultivation and manufacture of tea in this country, with a view of supplying our people with home-raised tea, and thus decreasing the importation of the article, I purchased from Mrs. Scraven plants and seeds for distribution, and I scattered these throughout the South. It is unnecessary to go into details at this time, and I will simply say that by great good fortune a Mr. Joho Jackson, who had for 15 years been cultivating tea in Assam, India, traveling in this country last spring, had his attention drawn to my efforts tending to encourage the cultivation of tea, and entered into correspondence with the department and visited me at Washington. The result was that Mr. Jackson took a trip through the South, visiting the various localities in which the tea-plant was growing, and was so entirely satisfied with the prospect of successful and profitable cultivation that he purchased the plantation of Mrs. Scraven, and commenced to establish a tea garden with the assurance that the department would aid him by all proper means. Mr. Jackson employed a large force of negro labor, put up some necessary houses, and has already 160,000 plants growing in 50 acres, which he proposes to increase to several hundred acres as rapidly as he can obtain proper seeds or plants.

I have but a short time since returned from an examination, assisted by Mr. Jackson, of a large area of South Carolina, in which are found many locations in which the soil and climate were pronounced by Mr. Jackson as exceedingly favorable for the production of the tea plant. This preliminary examination showed more land suitable for tea culture in the belt of country about 40 or 50 miles back from the coast, the best land being mostly situated in that portion which is regarded unhealthy for white people during the summer months, but not particularly unhealthy for the negro, who seems to live and thrive unharmed by the malarial atmosphere of the rich lands of that section.

For a number of years persons throughout the South owning one or more tea plants have made tea as best they knew how, but in a very crude fashion, bruising the leaves and drying them in a Dutch oven or even in the sun, and storing them away as a family supply of the fragrant herb, which they pronounced better than any they could purchase at the stores. Notably, this has been done in the last two years, since the publication and circulation by the department of a little treatise upon tea culture and manufacture. But no tea has been made of a commercial character until Mr. Jackson this spring commenced to manufacture tea in proper form, and sent it to the department as an evidence of what could be done, even with the old and neglected plants he had purchased with the Jones plantation. These teas are undistinguishable from the finest qualities of Indian teas on the market, and have been pronounced by the best tea-experts in this country and in London to be of superior quality and flavor. The prices offered for them are eminently satisfactory to the producer.

LARGE HORSES.—A consignment of horses, says the New York Tribune, has just been received in Boston from Normandy. The lot comprised 20 stallions and 6 or 8 mare colts, and is to be sent to Bloomington, Ill. Three of the horses weighed 2,010 lbs. each when shipped, and the rest averaged about 1,900. They are magnificent-looking animals, standing about 16 hands high, very stoutly limbed, and with heavy manes and tails. Three of them are valued at \$3,000 each, and the others at \$2,500 each for stock purposes. They are brooded with common Western stock, and the cross is an animal weighing from 1,200 to 1,400 lbs., and worth in the West from \$175 to \$200. They are used principally for draft horses, but are also easy drivers. They are noted for their docility and intelligence.



TEA PLANT ONE YEAR FROM SEED, AS GROWN IN JAPAN.

terrace or double hearths. Mechanical furnaces have been used with more or less satisfaction. At present the Mears Co. use a revolving hearth. In regard to this highly important matter of roasting, it may be said that any furnace which performs the work well may be selected for the purpose.

In stating the relative cost of chlorination by the Plattner and the Mears processes, the Mears Co. gives the estimates of Prof. Deetken, published in 1874, which are for California roasting, \$4.87; other work, including materials, \$6.23; total, \$11.10 per ton. Of this amount the cost of chlorination proper of dead-roast per ton, is given at \$2.21. The company assumes the present cost of the work in California to be 20% less than Deetken's estimates, and put the cost of chlorination, including materials and labor, at \$5 per ton instead of \$6.23; against this sum it places the cost of chlorination per ton of dead-roast by the Mears process, at \$2.25, based on the California rate; or, at the works of the company in North Carolina, where labor is cheaper, at \$1.91 per ton where the chlorine is not re-used; or, at \$1 per ton where the chlorine is re-used. Between these processes there is no difference in the cost of chemicals or other materials, or wages, the advantages of the Mears process consisting in the expedition of the operation, the conservation of chlorine and the close extraction of the gold,

lions of sheep, but it will return to the land the fertilizer needed to grow more cotton. These facts reveal at a glance the intimate relation existing between two of the great staples of the country—cotton and wool; and they suggest the immense possibilities of the future for both the North and the South. The development of the latter means business for the former. It is of the utmost consequence to the agriculturists of the North that a new and increased demand for the products of its industry shall spring up in our vast and sparsely peopled Southern States. They are filling up, fortunately, and are requiring more houses, and clothing, and utensils of all sorts—indeed, everything which our manufacturers can cheaply supply. Mr. Atkinson's proposed combination of the cotton and sheep husbandry ought to receive the most serious consideration. And he believes that a "cotton exhibition," during which all the facts he has stated and many others would be developed, would greatly stimulate interest in the direction he suggests.

PERSISTENT SNOW.—The Downieville Mountain Messenger, of August 28th, says there are several snow arches on the East Fork, about five miles above town. The largest is several hundred ft. long, spanning the river and completely covering it with a depth of solid snow to a height of nearly a hundred ft. Under these arches the water drips down in a steady shower.

The Florida Canal Project.

General Gillmore, who had been detailed to study the question of the feasibility of a ship canal from St. Mary's river, Fla., to the Gulf of Mexico, has embodied the results of his preliminary surveys in a report to the Secretary of War. General Gillmore does not think the Florida canal will be built, but he was directed to go over the ground in person, and he has made as complete a survey as the comparatively small sum allotted for the work permitted. Still, he regards the examination only as preliminary, and suggests that much additional information will have to be collected and numerous groups of shafts sunk in the swamps before the canal can be located and a reasonably exact estimate of its cost prepared. He is not positive that the St. Mary's river is superior to the Satilla for purposes of improvement for ship navigation, and recommends an examination of the Gulf coast in order that the best site for an artificial harbor may be selected. The great length of the line and the difficulties of access to intermediate localities have rendered it impossible for him to trace, with any degree of accuracy, the most available route between ocean and gulf. It is scarcely necessary, therefore, to consider the preliminary and alternate routes in detail.

The length of the canal route which Gen. Gillmore favors is about 169 statute miles, including a ship canal of 122 miles, with 34 miles of river navigation and 13 miles of deeper water from bar to mouth of the St. Mary's, and, on the other side, the entrance to the Gulf. The lowest estimate of the cost is \$50,000,000. The calculations for water supply are based upon a cross section of canal 80 ft. wide at bottom and 25 ft. deep, with a water surface 180 ft. in width. The section adopted has greater width at bottom and a depth and surface width somewhat less than that recommended by the technical subcommittee of the Paris Congress for the Panama canal. The ascent from the St. Mary's is made by means of seven lift-locks, each 15 ft. to the summit level, 108 ft. above sea level. Inland there are two locks, each of 10-ft. lift, and the level of the Gulf is reached by five locks of 15 ft. and one of 10 ft. From the mouth of the canal to the deep water of the Gulf a channel will have to be excavated and protected by jetties. There is an alternative project, by which the Suwannee river is used as a reservoir without any material saving in expense.

The principal benefits to be derived from the construction of the canal across Florida are fully considered in Gen. Gillmore's report. The route from New Orleans to New York will be shortened 497 miles; that from New Orleans to Liverpool, 412 miles. The voyage of a steamer of average speed would be shortened half a day, while the gain for sailing vessels would be considerably larger. The most liberal estimate of the amount saved in the consumption of coal and in ordinary running expenses is \$266,500. On this basis the tonnage dues through the canal would have to be made exceedingly light in order to attract business. The dangers of the passage through the Florida straits must also be taken into account, although the reduction in freight charges and insurance cannot be closely estimated. The calculation that \$894,000 could have been saved in floating property if the canal had been in operation during the five years ending June 30, 1879, bears upon this point of marine losses. The question of canal tolls is discussed in the report at length and with ability. The conclusion reached is that if the registered tonnage be adopted on the basis of toll charges, a vessel of 3,000 tons measurement could be charged two-thirds of 42 cents, or about 28 cents per ton for tolls. The same charges should apply to vessels plying between the Gulf ports and the ports of Europe, and, indeed, to all vessels using the canal, regardless of their nationality or the ports of their arrival and departure. Allowing for somewhat more favorable premises than those adopted in the foregoing discussion, the tolls might, perhaps, be carried as high as 35 to 37 cents per ton of registered tonnage during prosperous seasons, while at other times it might be necessary to drop them to 25 cents. These figures seem to condemn the project to financial failure. If the canal is to cost about \$50,000,000 and \$500,000 per annum for maintenance, and if all the tonnage passing through the straits is diverted to the shorter route at a charge of 28 cents per ton toll, the profits will be less than half of 1% of the original cost.—*Iron Age.*

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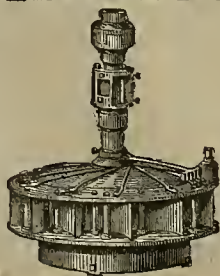
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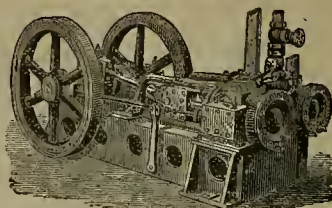
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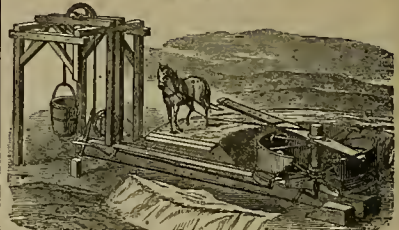
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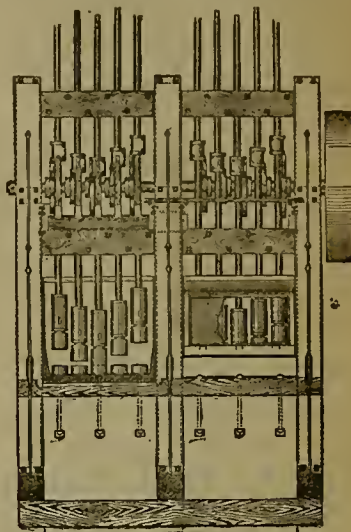
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California Inventors

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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING AUGUST 24th, 1880.

231,554.—HEEL SHANK AND COUNTER SUPPORTER.—Henry Flindt, Albany, Ogn.
231,430.—WINDMILL.—Henry P. Johnson, S. F.
231,443.—BOILER.—Joseph R. Mitchell, S. F.
231,623.—RUDDER.—N. B. Scott, Portland, Ogn.
231,502.—DOOR-KNOS ALARM.—John Simon, Oakland, Cal.

231,505.—STEERING APPARATUS.—A. J. Stevens, Sacramento, Cal.
231,638.—SQUAR MACHINERY.—W. H. Wiester, S. F.
231,617.—GATE.—Wm. Robinson, Bodega, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

CLAMP FOR ROCK DRILLS.—H. Richmann, San Francisco. Patented August 17th, 1880. No. 231,238. This invention relates to certain improvements in that class of devices which are used to support the cylinders of direct-acting engines intended to actuate, by air or steam, a drill or tool for boring rock; and it consists in a novel method of connecting the case or carriage carrying the cylinder to the column, and in an improved clamp for holding it in position on said column.

CHAIR BRACE.—S. P. Sorenson and J. C. Stanton, Rio Vista, Solano county, Cal. Patented August 17, 1880. No. 231,245. The construction of this improved chair brace consists in a peculiar combination of an adjustable side or arm-brace with the leg braces or rods, said arm-brace being provided with a turn-buckle, so that the regulation of the arm-brace also regulates the leg braces, and the parts of the chair are bound more firmly to each other.

EXPLOSION IN A COAL MINE.—A dispatch from Shenandoah, Pa., September 1st, says: This afternoon George Ormrod, Superintendent Kehley, of the Run colliery, and six others descended into the mine for the purpose of putting a door in the main battery, to see what progress the steam which was being injected into the mine was making on the fire in the "breasts." When the opening for the door was nearly completed a fall of earth occurred near the face, causing a concussion of gas, which blew the men in all directions. Simon Gregory was killed, Ormrod had a leg broken, and Joseph F. Jones had an arm broken. All the others were severely burned by steam. Gregory's body has not been recovered, the black damp being so bad that the miners could not venture far in without being overcome by it.

COLLAPSE OF THE WHEAT CORNER.—The recent collapse of the wheat "syndicate" has moved the Springfield Republican to characterize it as an "abominable conspiracy to control the price of the first necessary of life." Thanks to the generous earth, for two months cheap bread has been one of the certainties of the future. That paper says: With an American crop of from 450 to 500 million bushels, one-third at least available for export, a speculator on a basis of 16 million bushels is dealing in small potatoes. Mr. Keene must be reminded of an eloquent question in his favorite work: "Canst thou draw out leviathan with an hook?"

A RAILROAD CONDUCTOR KILLED.—A Tucson dispatch of 1st Sept. says that William Reed, recently promoted to a conductorship on the Southern Pacific Railroad, who was on his first trip last night, fell between two cars while in motion, between Pantano and Mescal. The cars passed over one of his legs and the foot of the other, crushing them in a terrible manner. He was brought to the hospital at this place to-day, where both limbs were amputated. It is thought that he cannot possibly live.

IN MR. HOLMAN HUNT'S picture of "The Flight into Egypt," the donkey from which he painted is stated to be an animal of purest breed, boasting a genealogy of two centuries; while the Virgin is taken from a lovely Jewish maiden living in the neighborhood of Bethlehem. One original feature in the picture will be a procession of infant spirits—those of the murdered innocents. Mr. Hunt has been engaged on this picture for four years, and it will take six months to finish it.

GOLD mining in Virginia is becoming an important industry. The mines of Buckingham, Spottsylvania and other counties are being energetically worked. The county of Montgomery is now developing a promising business in that line.

Is South America Rising or Sinking?

The question whether the South American continent is sinking or not is one on which considerable differences of opinion still exists. Prof. Orton several years ago expressed the belief that the barometric observations of the heights of the principal mountains, which have been continued through more than a hundred years, afforded evidence of a gradual sinking, and this opinion has prevailed extensively. Prof. Agassiz believed that the eastern coast was sinking while the western coast was rising, and Darwin infers, from the discovery of the remains of an ancient civilization on lands that are now too high for the development of human life, that the land is rising. Dr. W. Weiss read a paper before the Berlin Geographical Society at a recent meeting, in which he advanced the theory, founded on a comparison of observations which had been made at the mouths of rivers, that the continent is rising. The Isthmus of Panama seems to be rising, and signs of elevation are apparent on the north coast of the continent. The delta of the Magdalena river has suffered notable changes within recent times. The tertiary highland of Turbaco, which extends from Carthagena to Sabanilla, was once an island in front of the stream, as indicated by the forking of this river. One arm of the river empties toward the west near Carthagena, the other arm forms the present mouth with its branches in the lagoon of Santa Marta; ships formerly sailed into the western arm, which is not now navigable. The closing of this branch is generally ascribed to the luxuriant vegetation, but it is more than probable that other causes were combined with it. A small elevation would be enough to stop the flow of water, and the fact that such an elevation has taken place is shown by the discovery of recent shell-hells in a part of the lagoon. The bay of Santa Marta, with its monotonous sand flats between steep, bald cliffs and island-like uprising knobs, produces the impression of a recently dried sea-bottom. Similar appearances are presented farther east, to such an extent that it was believed in the sixteenth century that the sea had retreated. The region of the lagoon of Maracaybo, and indeed the whole coast of Venezuela, appears to have taken part in a movement of uprising. The existence of the delta of the Orinoco favors the theory of elevation, for, though it can not be held that deltas are not formed except where the ground is rising, it is nevertheless true that elevation is most favorable to their formation. The observations along the coast of British, French and Dutch possessions are contradictory; but as a whole they seem to indicate that the land is gaining on the sea. The character of the changes that are taking place at the mouth of the Amazon is generally supposed to indicate a sinking of the land, but there are circumstances that favor the opposite view. The signs that the upper part of the bed of the river is rising are numerous, and all the phenomena of washing away at the mouth which are generally considered evidences of a depression can be accounted for by supposing that the interior is rising faster than the coast. Indications of a recent elevation may be seen all along the coast from Cape St. Roque to the La Plata, in the hardened shore ridges of Rio Grande do Norte, Parahyba and Pernambuco, the elevated shorelines of Rio Vermiglio, Bahia and Rio Jequitinhonha, the coral reefs of the Abrolhos, the holes of the sea urchin found above the level of the sea near Cape Frio, the new formations near Rio de Janeiro, the deterioration of the harbors of Santa Catarina, Porto Alegre and other places. Darwin proved by the discovery of recent shell-deposits that the region of the La Plata was rising; since then some facts have been adduced pointing to a sinking, but the La Plata affords relations similar to those which have been referred to in the case of the Amazon. A lake in the Straits of Magellan containing marine animals, but situated at a higher level than that of the sea, is cited by Agassiz in proof that a rise of the land has taken place there. On the west coast signs of a sinking appear in the Chonos Archipelago, but they give way to trustworthy evidences of elevation in southern Chile. These continue to Callao and Lima, where a sinking is suddenly indicated. The land at Callao consists of gravel-hills, which may be considered as river and shore formations. Washings away from beneath, assisted by earthquakes, might readily have caused slight local falls, without making it necessary to invoke a sinking of the land. Not enough is known of the coast north of Callao to justify a definite expression of opinion.—*Popular Science Monthly* for September.

HURRICANE IN JAMAICA.—A terrific hurricane passed over the island of Jamaica on the night of Aug. 20th. Thousands of people are homeless. The crops, fruit trees, and farm produce were generally destroyed. Colossal trees were uprooted, and churches were demolished; and the barracks in the city were also destroyed. Three wharves are gone, and eight large and 32 small vessels were wrecked in the harbor. A famine is imminent, and help is required for the starving thousands.

THE RHENISH VINTAGE.—A late dispatch gives this intelligence: The consul of the United States at Cologne, commenting upon the prospects of the vintage of the Rhine and its tributaries the present season, says that it is thought by experienced observers that the vintage will not exceed one-fifth of the average yield.

San Francisco Plating Works.

Mr. E. G. Denniston, of the San Francisco Plating Works, exhibits at the pavilion a case of plated ware, a case of old goods replated and a large silver-plated mining plate. Mr. Denniston is the pioneer plater in this city, doing the work in all its branches—gold, silver and nickel. A specialty at these works has been, for some time, silver-plated amalgamating plates for miners' use. It has been found by experience these plates are very much superior to the ordinary copper ones. Mr. Denniston now supplies them to all the leading mills on this coast. He has on exhibition in this fair the largest silver-plated plate ever prepared. Mr. Denniston is a master artist in this line. His plating works are among the most extensive in this country. He has the largest silver-plating vat in the world, and is prepared to furnish silver plated amalgamating plates for quartz mills on the shortest notice. His nickel and copper-plating vats are the largest on the coast. He has an engine boiler for polishing and an electric machine for facilitating the plating process.

A recent visit to this establishment repaid us, for we saw there one of the largest, most elaborate and elegant specimens of gold plating ever done here or anywhere else. It is a large, ornamental double gate, each section being two feet wide and seven feet high, and finished with a cap of interlacing arches, surmounted with a crown. Underneath this symbol is the monogram of the person whose silent resting place it is destined to adorn. This exquisite piece of workmanship is for the mausoleum of a former well-known citizen, and must take rank among the most noted and beautiful *chef-d'œuvre* of industrial art. The moulding is of brass, rarely designed and finished. In order to do the plating a special vat was made. Part of the design is in dead gold, part bright, the whole being of unique and striking appearance.

POPULAR SCIENCE MONTHLY.—More than any other American magazine, it seems to us, the *Popular Science Monthly* maintains the quality of attractiveness in its well-filled and valuable pages, and we give it cordial welcome to our table. The contents of the September number embrace no less than 13 articles on various subjects of interest, besides editorials, miscellany, notes, etc., all relating to the higher applications of science. The opening article on "Comparative Jurisprudence," by William M. Ivins, will prove both interesting and instructive to the lawyer of critical taste. The Hon. Auberger Herbert's article on "State Education: A Help or Hindrance?" seems to prefer the voluntary system of education, and treats the subject after the manner of Herbert Spencer. The latter does not agree with those writers who, like Macaulay, held "that whoever has the right to hang has the right to educate." A brilliant article on celestial dynamics is Dr. C. B. Waring's, "The Solar System and its Neighbors." The "Legal Prosecution of Animals" is a very curious article, the reading of which will clearly show the degrading stupidities from which science has relieved society. Prof. Preyer's "Psychogenesis in the Human Infant" is an able and interesting essay on mental development in infants, and commends itself especially to intelligent mothers. There is an interesting paper, well illustrated, on "Climbing Plants," by Francis Darwin; and a very delightful one by Prof. Grant Allen on the "Æsthetic Feeling in Birds." "The English Precursors of Newton" is the first installment of a most remarkable chapter in scientific history. The biographical sketch, accompanied with a portrait of the distinguished naturalist, Dr. Joseph Leidy, is pleasant reading. And, finally, there is a rasping article by the editor on "Sewage in College Education." Not the least valuable feature of the *Monthly* is its copious miscellany. It is published by D. Appleton & Co., N. Y., at \$5 a year or 50 cents a single copy.

THE SOUTHERN PACIFIC IN ARIZONA.—The Southern Pacific railroad is fast pushing its work through Arizona. On the 23d of August they had successfully surmounted all the obstacles met in the Dragoon range of mountains, and the builders immediately began to push forward at the liveliest rate for El Paso, over 200 miles distant from the end of the track. It is their intention to accomplish this distance in 100 working days. The expedition of the builders, considering the climate of the country they are working in, is simply wonderful. For example: on the 24th ult., they laid 12,200 ft. of steel rails, on the 25th, 11,600, on the 26th, 12,800, and on the 27th, 12,000. This is extraordinary work. At this rate the company will carry the road to El Paso by Christmas certainly. The road is now completed and in running order 112 mile from Tucson, and is only 25 miles from the boundary line of New Mexico, which will be reached in about 12 days. Since the close of January of this year the company has built and put in perfect order 176 miles of steel-laid road.

LATELY the blueberry plains in Washington county, Maine, were a vast camp ground, 1,000 pickers tenting there,

News in Brief.

SINCE the beginning of the year there have been 140 duels in France.

FIVE cases of supposed yellow fever have appeared on a Mississippi tow boat.

FOUR colored Episcopal ministers are at work in Tennessee among the colored people.

ONE man was killed and three were injured by a collision on the Lake Shore road, Aug. 28th.

It is said that 16 bridesmaids will be one of the features of an October wedding at Trinity Church.

CALVIN SYKES, of Snfield, Conn., refuses to shake hands with any one, and has not done so for years.

FIVE boys riding on the top of a car were struck by a bridge and killed near Lowell, Mass., on Saturday night, Aug. 28th.

THE Mormons began work on their new temple 20 years ago, have expended \$4,000,000 on it, and it is now one-fourth done.

THOMAS SCOTT and Mrs. Heffner, while walking on the track near Mount Carbon, Pa., Aug. 30th, were killed by the fast express.

HORACE DAVIS has accepted an invitation to deliver the annual address before the State Agricultural Society at the State fair.

JAMES BENNETT, a fireman on the Denver and Rio Grande railroad, was murdered by drunken roughs at San Antonio, Col., Aug. 30th.

THIRTEEN steamers of the Dundee whaling fleet had taken up to this 15th of Aug., 105 whales, producing about 1,000 tubs of oil.

It is thought that six passengers and two sailors were lost at the time of the burning of the steamer *Marine City* on Lake Huron.

MR. CONWAY says that Carlyle neither reads nor writes, but lies on a sofa and longs for death. Carlyle will be 82 in December.

DR. W. S. BOW EN has examined 1,820 railroad employees in Rhode Island for color blindness, of whom less than 4% were rejected.

ALLEGED intellectual Boston girls at Swampscott call the beach "Neptune's lawn," and allude to shells as "products of the deep."

AT DALLAS, Texas, August 27th, 3,000 people, women predominating, collected to witness the hanging of Allen Wright, a colored man.

CAPT. SIR LAMONT LORRAINE, well known in this country in connection with the *Virginian* massacre, is to take command of the *Cleopatra*.

C. M. CHASE has been appointed to fill the vacancy on the State Board of Agriculture caused by the resignation of Marcus D. Boruck.

The city of Philadelphia has bought for \$10,000 the marble fountain made by the late Margaret Foley of Boston, and shown at the centennial.

THE authorities of Detroit, Mich., have refused to license a company of hare-legged blondes who sought to exhibit their figures there.

PERE HYACINTHE, Aug. 28th, solemnized the marriage of the Abbe Laine, until recently a priest of the diocese of Mans, with a Madame Wochese.

THE Pope has assented to the proposal that a portion of the Frenob Jesuits should form a society for the propagation of the faith in central Africa.

THE Province of Quebec Mortgage Bank has been founded by the Bank of Paris, with a capital of \$25,000,000, the first issue to be \$5,000,000.

FREDERICK FREY, living with John Chapman at Suffield, Conn., mistook a teaspoonful of arsenic last week for another drug, and died in consequence.

A LEICESTER (Mass.) woman who has felt something crawling about her stomach more or less for 15 years, vomited up a lizard over three inches long the other day.

PROF. SHELDON has been commissioned by the Canadian government to write a report on the advantages and disadvantages of Canada as a place of settlement for English farmers.

Two or three short railroads run out of the city of Mexico for a few miles, and the trains are usually accompanied by a rear guard of soldiers for protection against the brigands.

THE reckless gambling at London clubs has become a scandal, for scarcely a week passes that the quarrels of the alleged gentlemanly gamblers do not extend to the police court.

JOHN RARNHART SHEFFLEY and his wife, Maria Barbara Sheffley, of Limerick square, Montgomery county, Pa., have been married for 71 years. The husband is 89 years old and the wife 88 years old.

MR. JOHN C. HAMILTON, son of Alexander Hamilton, is in vigorous health, despite his 86 years. He made a visit recently to Hartford to view the model of a statue of his father, which is being reproduced in granite.

PROF. TAIT, at a meeting of the Royal Society of Edinburgh, on the 8th of June, sent in a note on the theory of the "15" puzzle, and gave a rule for determining whether a particular arrangement was solvable or not.

REV. DR. THOMAS GALLAUDET, who sailed on Saturday on the White Star steamer *Britannic*, is a delegate to the convention of deaf mutes to be held at Milan next month. He is accompanied by his wife, who is a deaf mute, and by a young lady, also a deaf mute.

PROF. MOMMSEN, whose historical library and manuscripts were burned in Germany, has declined to have a fund raised in England. He says the property was insured for enough to cover its intrinsic value, and money cannot restore it. He is going soon to Italy to renew his copies of ancient Roman inscriptions.

Pocket Mining Atlas,

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BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

FRESH attractions are constantly added to Woodward's Gardens, among which is Prof. Gruber's great educator, the Zoographicon. Each department increases daily, and the Pavilion performances are more popular than ever. All new novelties find a place at this wonderful resort. Prices remain as usual.

INVENTORS, and others interested, will receive Dewey & Co.'s MINING AND SCIENTIFIC PRESS FREE OF CHARGE on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

J. C. COLMERY is requested to report to this office from Humboldt Co.

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Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE
Napa Con. Quicksilver Mining Company,
SAN FRANCISCO, AUGUST 30th, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 12) of Ten (10) Cents per share, was declared, payable on WEDNESDAY, the first day of September, 1880, at the office of the Company, Room 16, Academy Building, No. 330 Pine St., San Francisco, California.

WM. W. PARRISH, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE
Standard Consolidated Mining Company,
SAN FRANCISCO, SEPTEMBER 1, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 19, of Seventy-Five cents (75) per share was declared, payable on MONDAY, September 13, 1880, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York.

WILLIAM WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 300 Montgomery St., San Francisco, Cal.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

Notice is hereby given that at a meeting of the Directors held on the Eleventh day of August, 1880, an assessment (No. 43) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 402 Front street, room 8, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Thirtieth day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Eleventh day of October, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

W. O. WILSON, Secretary.
Office—402 Front street, room 8, San Francisco, California.

Techattucup Silver and Gold Mining Co.

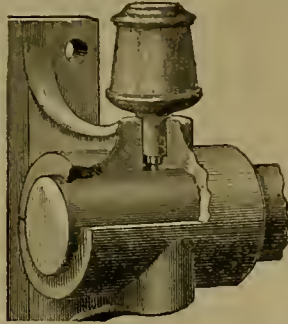
Location of principal place of business, San Francisco, California. Location of works, El Dorado canyon, Lincoln Co., Nevada.

Notice is hereby given that at a meeting of the Trustees, held on the 24th day of August A. D. 1880, an assessment (No. 7) of One Dollar per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, No. 237 First street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 20th day of October, A. D. 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

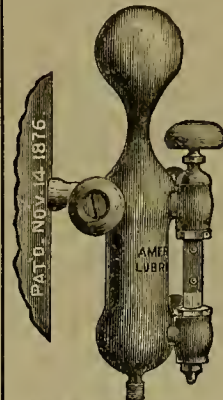
C. F. MOUTRIKOP, Secretary.

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The Albany Cylinder Oil does not contain fatty acids—is incapable of being decomposed and does not form insoluble soaps. If it becomes mixed with boiler incrustation it diminishes its tendency to cling to the sides of the boiler, and thus exerts in this respect also a beneficial action.

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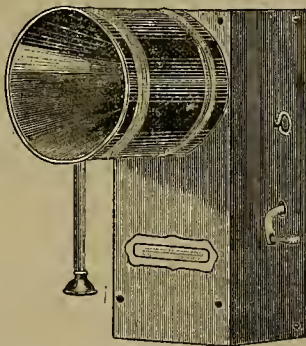
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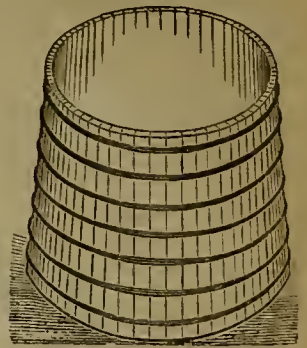
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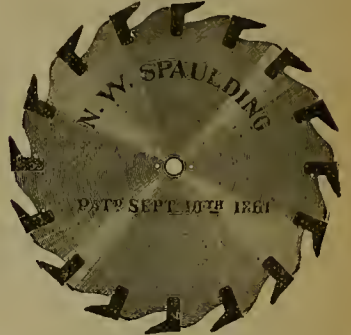
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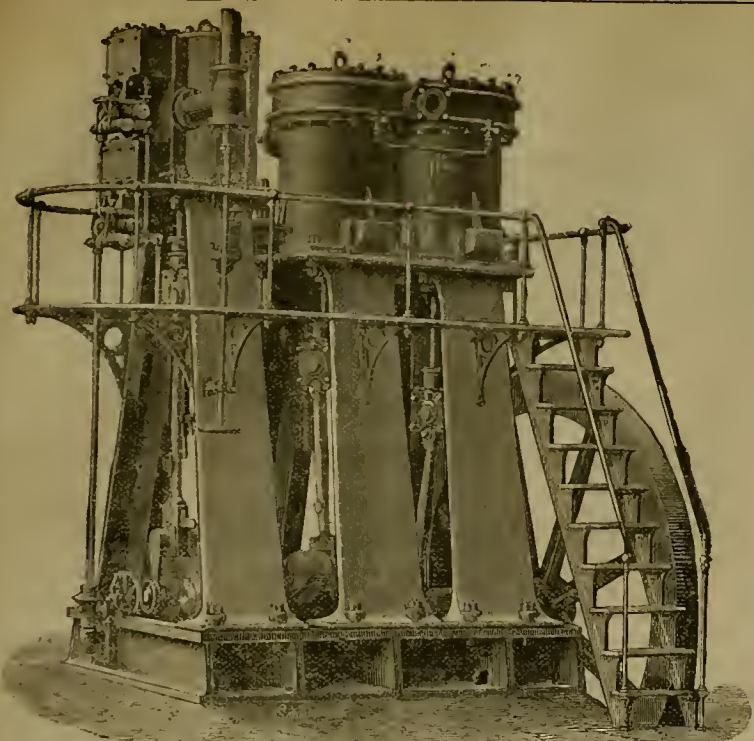
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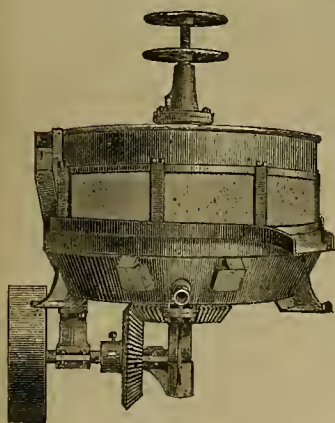
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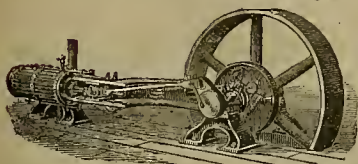
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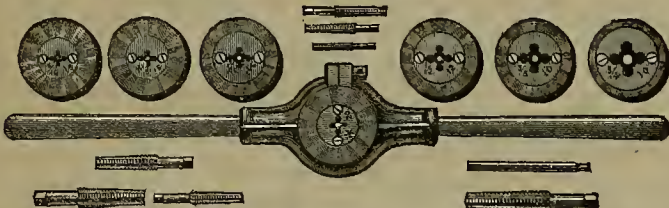
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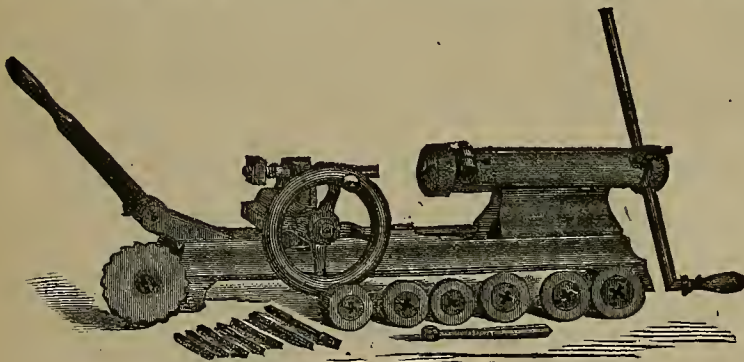
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SAN FRANCISCO, SATURDAY, SEPTEMBER 11, 1880.

VOLUME XLII
Number 11.

A New Submarine Torpedo.

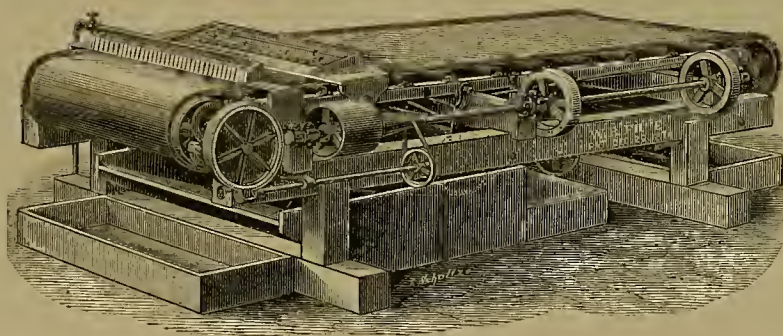
The mysterious torpedo, about which so much has been said and written, which is being experimented with at Willett's Point, is entirely different from any other floating torpedo known in this country. The torpedo is the design of a Mr. Sims. It is thus described by the *American Ship*: This torpedo is of the ordinary cylindrical cigar-shaped hull, with fins lines, and is divided into three apartments, the forward one, or magazine, being filled with an explosive compound, which is fired by electricity. The middle compartment contains a roll of fine telegraphic wire about 1½ miles long, which is played out through an aperture in the bottom, while in the after section is located the propelling engine, which drives a screw propeller at a velocity of, so far as tested, 12 miles an hour. The motive power is electricity, conveyed to the torpedo through this roll of wire referred to; and through this wire connection control is exercised over the screw and rudder, as well as the firing of the magazine. From the torpedo rises two stanchions, placed on each outer section, which connect with a light float, V-shaped on the sides and convex on the top. The torpedo proper is raised or lowered by means of the stanchions and float, so that any class of vessel with an overhang or partly armored can be reached by the impinging end of the torpedo, and the explosive power exerted at any depth of water desired. As seen in the water, nothing is seen but the crest of the float with the heads of the stanchions, on which are placed tiny flags, which serve to show the operator the direction and speed of the torpedo machine, and enable him to turn the proper switch and fire the charge of dynamite or other compound. Thus far the experiments have proved very successful. The electric battery for working this torpedo from forts is kept within the fort or placed in a bomb-proof near the scene of operations. It can also be operated from the deck of a cruising vessel or launch.

THE FUTURE LUMBER SUPPLY.—What are the lumbermen of the Pacific coast doing to replace the forests they destroy? This is a serious matter, and it ought to be looked squarely in the face. It is attracting the attention of ship builders and other lumber interests on the Atlantic side, and it should not be neglected on the Pacific where the lumber industry is assuming vast proportions. In relation to this business, the *American Ship* thinks that the Lumbermen's Association should consider the matter and endeavor, through the action of its members, to secure protection for the timber lands so that the trees shall be thinned out rather than destroyed, and given an opportunity to make fresh growths from year to year. That journal says: Some legislation may be needed in the public interest for the protection of the forests against the cupidity of men, anxious only about present profits, and the Lumbermen's Association ought to be able to suggest measures that will be fair to all interests. There is scarcely a nation in Europe that does not to-day regret its neglect to provide in time for forest culture, though nearly all now have laws on the subject. The existing laws in this country are really applicable only in the far Western States, where there are public lands which might be worth obtaining for forest culture. In the States now most in need of growing forests, there is very little tree planting, but the waste goes on at a great rate.

NATURAL SILVER PLATING.—A singular instance of natural silver-plating is reported by the *Register-Call* as occurring in the Lord of Lorne mine, American Flat, Gilpin county, Col. The sides next to the vein and the hanging wall are covered with a thin coating of native silver as smooth as glass. The vein itself is narrow, and is prospected by means of a tunnel. The superintendent of the mine says this curious feature of the inclosing walls is observable so far as the tunnel has followed the vein. The ore is friable and easily mined, and discloses both chlorides and sulphurets, but does not assay highly. The filmy coating of silver on the walls was apparently condensed and deposited there under tremendous pressure, for it has a smooth and burnished appearance.

Petroleum as Fuel.

It seems that petroleum is successfully used as fuel in generating steam. A special correspondent of the London *Daily News* gives a description of the mail steamer *Cesarewitch*, on which the application of petroleum has been made. The vessel is of English build, and is the swiftest mail steamer on the Caspian sea, being only surpassed in speed by the *Nar Eddin Shah* war steamer. That paper says: To convey it from the Baltic to the Caspian, it was necessary that it should traverse the whole of the Neva ship canal, and afterwards descend the Volga to Astrakan. On the Neva canal are 54 locks, and the *Cesarewitch's* length was too great to allow of her entering them. Her present chief engineer, Mr. Vine, an Englishman, cut her into two pieces amidships, and filling up the open extremities with iron bulkheads, floated her in this guise through the canal. At Astrakan the same gentleman put her together again, and has remained ever since in charge of her machinery. Her boilers are heated by petroleum refuse instead of coal, a system which effects an enormous saving of expense and labor, the heating apparatus being as thoroughly under control as a gas jet, and requiring but one man to manipulate it. It consists of two tubes, about an inch in diameter, terminating at the same point in a small ohlong



THE FRUE CONCENTRATOR.

brass box. Through one of these tubes the black residual naphtha (*astaki*) drops slowly, being blown into spray by a jet of steam from the boiler, conveyed through the second tube. This spray, when ignited, forms a great sheet of flame, which is projected into the hollow of the boiler. It has the immense advantage of requiring no stoking, as no ashes are produced; and by turning down the flame to the required degree, the steam can always be kept up to the pressure required for immediate starting without the tedious and more or less wasteful process of "hanking" the fires. An arrangement like this is invaluable for cruisers lying off any enemy's port, and requiring to hold their steam in readiness. It is intended to apply the same system of heating to the locomotives on the Tiflis Baku railway, when completed; and it will, doubtless, play an important part in the steam communications destined at no distant period to traverse the Steppes to Khiva and Samarcand.

Too ENERGETIC.—Late advices from Santa Fe state that at the town of Las Placitas, the new mining camp, distant some 40 miles from Santa Fe, where gold was discovered in the streets, the indignant inhabitants drove the discoverer, one Jesse Martin, out of the place. It appears that the energetic prospectors, of whom there was a large influx, attacked not only the streets, but the foundations of houses, and sunk shafts in the cellars. They were far too energetic for the easy-going Mexicans.

BODIE PLACERS.—The *Standard-News* says very little placer mining is now going on on the eastern slope of Bodie ridge or on the flat beyond, but that nearly all the ground in that locality has been taken up; and when the Red Cloud, Bodie-Mono and Dudley begin to discharge heavy streams of water over the eastern slope there is no doubt that large quantities of gold will be extracted.

The Frue Concentrator.

We give an engraving herewith of one of the most successful of the mining appliances used on this coast. It is the Frue ore concentrator or vanning machine, and is on exhibition in the Mechanics' fair, being a prominent feature in the machinery department.

This machine has been described as an improvement on Brunton's revolving belt, but really had its origin in a machine much more resembling the old California "cradle." The employment of a revolving belt, either plain or with riffles or hucks, as a carrier for various materials, is of very old date; but the application of a lateral shaking motion to such a belt—a motion closely resembling that given to a shovel in vanning by hand—is a novelty, and constitutes the essential element of the success of this machine. A revolving belt of canvas, with a lateral or end blow, has been used in Germany and England, and also in the States; and though pretty good results were obtained with it, the difficulty of making the belts last proved too great. The side shake is as great an improvement over the blow, as the perfect rubber belt, with permanent high flanges, is superior to the rough, costly, short-lived canvas belt.

For localities where water is scarce, the Frue has the advantage over any other concentrator, that the amount of water required is very small.

For one machine one-half inch of water, miners' measure, or six and one-eighth gallons a minute, is as large an amount as is ever needed on any material; while on some ores three gallons are sufficient, and by returning the water from the settled tailings, one-half gallon will keep up the loss. The hoiler for a five-stamp battery crushing daily from 10 to 12 tons of ore with two concentrators, calls for one gallon of water a minute; hence, in places where water is extremely scarce, two gallons a minute can supply five stamps, two Frue ore concentrators and the hoiler.

The capacity of each machine is from six to eight tons in 24 hours. The power required to drive them is not over one-half horse power per machine. The labor required is very small—one man on a watch can attend to 16 machines. The wear and tear is merely nominal; the belt will last for years, and any part of the machine can be replaced with a duplicate which will be its exact counterpart. The weight of each machine boxed ready for shipment is 2,200 lbs.; no part weighs over 250 lbs. The price of each machine is \$750, U. S. gold coin, at the works in San Francisco. Orders can generally be filled on four days' notice.

These machines are now in successful operation in many of the mining districts of California and Arizona, Colorado and Montana, and elsewhere; and numerous testimonials prove their perfect work. They have been especially useful in working the gold sands of our ocean beaches. The agents, Adams & Carter, Room 7, 109 California St., will give further information to those desiring it.

In Granite Basin, Plumas county, can be seen a curiosity in the shape of an old quartz mill, which at one time was owned by Mexicans, and which, it is said, was brought from England. It is entirely of wood, and would provoke a smile in these days of improved machinery.

A Volcano Rising from a Lake.

M. de Lessps has communicated some interesting papers on the extraordinary phenomena which accompanied the earthquakes of January last in the republic of San Salvador, to which the French journals add accounts furnished by the consul of the republic and the French consul in Guatemala. The shocks which, although of considerable strength, were not violent enough to do harm to houses, seemed to proceed from a center in the Lake of Bopango or Cojuteque. The waters of this lake having fallen from an extraordinary level to which they had risen before the shocks began, a small island with three peaks appeared to be rising from the center of the lake. One of the peaks reached a height of about 90 feet above the water, and sent forth a column of smoke and flames of considerable height. An attempt was made to approach the island in a boat, but the waters in contact with the hot rock were boiling, and gave out great jets of vapor. The water around the volcano continued to boil for some time after the eruption was over and indicated a temperature of 100° at the edges of the lake. The fish were cooked and rose to the surface, and with them many shells and aquatic animals. The lake is in the line of the volcanoes of Central America, where volcanic cones seem to alternate with lakes, and itself occupies the place of an ancient volcano. Its water is brackish, bitter and almost slimy, and has at times given out bubbles of sulphuretted gas. The rise of the water preceding the eruption agrees curiously with an ancient tradition that earthquakes may be expected whenever the level of the lake is elevated. So fully was this believed that the people were formerly accustomed to dig channels to carry off the superfluous waters; and while they did this they had no earthquakes. These facts have a bearing upon the theory that earthquakes and volcanic phenomena are largely due to the action of water.—*Popular Science Monthly* for September.

IMPROVED LOCOMOTIVES.—The little tank engines which daily go puffing overhead through the street of New York (on the elevated railways), says the *Railway World*, have given such satisfactory performances that plans have been prepared for building others of the type with 4, 6, 8 and even 12 driving-wheels, and calculated for the heaviest work. The advantage claimed for them is, that in proportion to their weight they show large tractive power. And in general it may be said that there is a noticeable tendency to increase the size not only of engines, but of cars as well. Freight cars of 20 tons are supplanting those of 12 tons, and the eight-wheel locomotive, which has been favored for freight service, is being replaced by those of the "Mogul" and the "Consolidation" types. They have been deemed objectionable as wearing hard on the tracks; but as they pull larger trains, and so reduce the number of trains necessary for a given service, the objection, to a considerable extent, nullifies itself. And, moreover, they largely lessen the wages and fuel accounts. And there are rumors of a successful oil-burning locomotive. We took the idea of the locomotive from England, but we have worked over it with originality and independence of authority and tradition, until we have developed a distinctly American type of engine, which, to those knowing how to rightly appreciate and interpret it, is expressive of much that is characteristic in our national life.

MINERAL TANNERIES.—The *Frankfort Patent Gazette* says that mineral tanneries are making great progress on the continent. Recently a model tannery, according to Heinszerling's process, has been erected at Glasgow. A company has been formed in Belgium for the introduction of the process; and it is in operation at Jenappe. The *Gazette* says the process requires no change in the plant of existing tanneries. The new Belgium company has secured the exclusive right to use the process in France, but under the condition that it shall expend, within the period of three years, not less than 4,000,000 francs in the erection of model tanneries. One of these tanneries is also in course of construction at Bilbao, in Spain.

METEOROLOGICAL.

Mountain Lakes of the Sierra Nevada.

(By PROF. JOHN LE CORTE.)

Hundreds of little Alpine lakes, with their clear, deep, cold, emerald waters, are embosomed among the crags of the Sierra Nevada mountains. Their origin may be traced to the more powerful actions of glacial agencies in past times; in some cases, gorges dammed up by ancient moraines. The streams that now supply these "Gems of the Sierra" are born in the cold, gloomy solitudes of the upper mountain region, amid perpetual snow banks. Many of these charming lakes are nestled in the least explored portions of the "High Sierra," and have not been mapped or described; nay, some of them have as yet no designating names. They are the reservoirs of melting snows, and some of them—as those near the headwaters of the Yuba—are the sources of summer supply for hundreds of miles of mining ditches. Hence, the existing condition of our topographical knowledge of these wild and imperfectly explored mountain fastnesses renders it impossible to furnish anything like a complete catalogue of the mountain lakes of the Sierra Nevada. The following table embraces some of the more conspicuous lakes embosomed among the crags of that portion of the Sierra Nevada extending from Lassen's Peak (lat. 40° 30') in the north, to Mt. Brewer (lat. 36° 30') in the south. With the exception of Tahoe, most of them are comparatively small:

Mountain Lakes of the Sierra Nevada.

NAME.	Max. Length in Miles.	Max. Width in Miles.	Approx. Area in Sq. Miles.	Height of Surface above Sea Level in Feet.	Height of Bottom above Sea Level in Feet.
Gold.....	4	2	.....	90	6,814
Truckee.....	3	2	.....	65	.....
Eureka.....	2	2	.....	180	.....
Meadow.....	2	2	.....	5,064	.....
Donner.....	2	2	.....	5,000	.....
Washoe.....	2	2	.....	5,000	.....
Tahoe.....	21 1/2	12	192	6,247	1,645, 4,002
Tenaya.....	1	1	.....	.....	.....

These Alpine lakes, with their clear, fresh, snow-fed waters, surrounded by lofty snow-clad peaks, whose slopes are covered with magnificent groves of pine and fir, constitute the most attractive feature in the lesser summit valleys of the Sierra Nevada. The charmingly picturesque character which they impart to the wild and rugged scenery of these mountains has not been overlooked by tourists, poets and artists. But the inaccessibility of most of these "emerald gems" has prevented them from receiving that notice which their exquisite beauties deserve. As civilization penetrates into these mountain retreats, they will become more accessible, and consequently better appreciated by cultivated visitors. The most extensive, as well as the most celebrated, of these bodies of fresh water is Lake Tahoe. This lake deserves more extended notice:

Lake Bigler, or Lake Tahoe.

Situation.—Lake Tahoe, otherwise called Lake Bigler, the largest and most remarkable of the mountain lakes of the Sierra Nevada, occupies an elevated valley at a point where this mountain system divides into two ranges. It is, as it were, engulfed between two lofty and nearly parallel ridges, one lying to the east and the other to the west. As the crest of the principal range of the Sierra runs near the western margin of this lake, this valley is thrown on the eastern slope of this great mountain system. The boundary line between the States of California and Nevada makes an angle of about 131° in this lake, near its southern extremity, precisely at the intersection of the 39th parallel of north latitude with the 120th meridian west from Greenwich. Inasmuch as north of this angle this boundary line follows the 120th meridian, which traverses the lake longitudinally from two to four miles from its eastern shore-line, it follows that more than two-thirds of its area falls within the jurisdiction of California, the remaining third being within the boundary of Nevada. It is only within a comparatively recent period that the geographical co-ordinates of this lake have been accurately determined.

Dimensions.—The greatest dimension of this lake deviates but slightly from a meridian line. Its maximum length is about 21.6 miles, and its greatest width is about 12 miles. In consequence of the irregularity of its outline, it is difficult to estimate its exact area; but it cannot deviate much from 192 to 195 square miles.

Altitude.—The railroad surveys indicate that the elevation of the surface of its waters above the level of the ocean is about 6,247 ft.

Drainage Basin.—Its drainage basin, including in this its own area, is estimated to be about 500 square miles. Probably more than 100 affluents of various capacities—deriving their waters from the amphitheater of snow-clad mountains which rise on all sides from 3,000 to 4,000 ft. above its surface—contribute their quota to supply this lake. The largest of these affluents is the Upper Truckee river, which falls into its southern extremity.

Outlet.—The only outlet to the lake is the Truckee river, which carries the surplus waters from a point on its northwestern shore out

through a magnificent gorge; thence northeast through the arid plains of Nevada into Pyramid lake. This river, in its tortuous course, runs a distance of over 100 miles, and for about 70 miles (from Truckee to Wadsworth) the Central Pacific railroad follows its windings. According to the railroad surveys this river makes the following descents:

	Distance	Fall.	Fall per Mile.
Tahoe to Truckee.....	14 miles	428 ft.	30 1/2 ft.
Truckee to Reno.....	34 "	1322 "	39 "
Reno to Wadsworth.....	35 "	420 "	12 "
Wadsworth to Pyramid lake.....	18 "	187 "	10 "
Tahoe to Pyramid lake.....	101 "	2367 "	23 1/2 "

Discovery.—There is little doubt but that this is the lake of which the Indians informed John C. Fremont of on the 15th of January, 1844, when he was encamped near the southern extremity of Pyramid lake, at the mouth of Salmon, Trout or Truckee rivers, for he says, "they (the Indians) made on the ground a drawing of the river which they represented as issuing from another lake in the mountains, three or four days distant, in a direction little west of south, beyond which they drew a mountain, and further still two rivers, on one of which they told us that people like ourselves traveled." (Vide Report of exploring expedition to Oregon and north California in years 1843-4. Doc. No. 166, p. 219). Afterwards, when crossing the Sierra Nevada near Carson pass, Fremont seems to have caught a glimpse of this lake, but deceived by the great height of the mountains on the east, he erroneously laid it down on the western slope of this great range, at the head of the south fork of the American river. It is evident, therefore, that the Indians had at that time a more accurate idea of the mountain topography than the exploring party. On Fremont's map the lake is laid down tolerably correctly as to latitude, but is misplaced towards the west about one-fourth of a degree in longitude, thus throwing it on the western slope of the Sierra Nevada and making the head branches of the American river its outlets.

Name of Lake.

Few natural features of our country have enjoyed a greater diversity of appellations than this remarkable body of water. On Fremont's map this lake is called Mountain lake, but on the general map of the explorations, by Charles Preuss, it is named Lake Bonpland, in honor of Humboldt's companion. Under one of these names it appears, in its dislocated position, on all the maps published between 1844 and 1853.

About the year 1850, after California began to be settled in its mountain districts, several "Indian expeditions" were organized by the military authorities of the State. It seems probable that this lake was first named Bigler by one of these "parties of discovery" (probably in 1851) from "Hangtown" (now Placerville), in honor of Gov. John Bigler. Under the name of Lake Bigler it was first delineated in its trans-mountain position on the official map of the State of California, compiled by Surveyor-General Wm. M. Eddy, and published in 1853; and thus the name became for a time established. From 1851 to 1863 this name seems to have been generally recognized, for it is so designated on the maps and charts of the United States prepared at Washington. About the year 1862 the first mutterings of discontent in relation to the name by which this lake had been recently characterized came from the citizens of California. On two occasions it has been brought under the notice of the Legislature of this State. During the 15th session (1862) of the Legislature of California, Assemblyman Benton introduced a bill to change the name of "Lake Bigler." The bill was rejected. The friends of Gov. Bigler did not hesitate to ascribe the desire to change the name of this lake to the inspiration of partisan animosity intensified among the political opponents of the Ex-Governor by the state of feelings engendered during the progress of the civil war.

During the session of the Legislature of California for 1869-70, an act was passed to legalize the name of "Lake Bigler" (Vide "Statutes of California," 1869-70, p. 64.) Notwithstanding this statutory enactment, for the past ten years there has been a very strong tendency in the popular mind to call this lake by the name of Tahoe.

On the map of California and Nevada published in 1874 it is still put down as Lake Bigler, but on the map of the same two States published in 1876 it has the double designation of Lake Bigler or Tahoe lake. At the present time this beautiful body of water seems to have entirely lost its gubernatorial appellation, for it is now almost universally designated Lake Tahoe. It is so named on the "Centennial map of the United States," compiled at the "General Land Office," at Washington, and likewise on the "map of California" contained in the ninth edition of the "Encyclopedia Britannica, Article California." Moreover, it is designated Lake Tahoe in the reports and maps of the Board of Commissioners of Irrigation, published in 1874, as well as in those of the "Water Supply of San Francisco," published in 1877. The cause of this change of name can hardly be sought exclusively in the waning popularity of the worthy Ex-Governor, but rather in the following considerations: 1st. In the strong tendency of the American people to retain the old Indian names whenever they can be ascertained; 2d, in the instinctive aversion in the popular mind to the perpetuation of names of political aspirants, by attaching them to conspicuous natural features of our country; and 3d, in the fact that the

State of Nevada designated its portion of said lake by the Indian name.

Meaning of Tahoe.

The meaning of the word Tahoe is by no means certain. It is usually said to be a Washoe Indian word, meaning "Big Water;" according to others, "Elevated Water;" others, "Deep Water;" and others, "Fish Lake." Whatever may be the meaning of this name, there can be no question but that the Washoe Indians designated this remarkable body of water by some characteristic name long before the earliest pioneers of civilization penetrated into its secluded mountain recess.

Physical Studies of Lake Tahoe.

During the summer of 1873, the writer embraced the opportunity afforded by a six weeks sojourn on the shores of this lake, to undertake some physical studies in relation to this largest of the "Gems of the Sierra." Furnished with a good sounding-line and a self registering thermometer, he was enabled to secure some interesting and trustworthy physical results in regard to this beautiful lake.

(1) **Depth.**—It is well known that considerable diversity of opinion has prevailed in relation to the actual depth of this lake. Sensational news-mongers have unhesitatingly asserted that in some portions, it is absolutely fathomless. It is needless to say that actual soundings served to dispel or rectify this popular impression. The soundings indicate that there is a deep subaqueous channel traversing the whole lake in its greatest dimensions, or south and north.

Beginning at the south end, near the "Lake House" and advancing along the long axis of the lake directly north towards the "Hot Springs" at the northern end, a distance of about 18 miles, we have the following depths:

Station.	Depth in Feet.	Depth in Meters.
1	900	274.32
2	1,385	422.14
3	1,495	455.67
4	1,500	457.19
5	1,500	457.19
6	1,540	469.33
7	1,504	458.41
8	1,600	487.67
9	1,640	499.50
10	1,045	318.39

These figures show that this lake exceeds in depth the deepest of the Swiss lakes, (the lake of Geneva,) which has a maximum depth of 334 meters.

On the Italian side of the Alps, however, lakes Maggiore and Como, are said to have depths respectively of 796.43 and 586.73 meters: These two lakes are so little elevated above the sea that their bottoms are depressed 587 and 374 meters below the level of the Mediterranean.

Systematic soundings such as would be required to furnish contour sections of the bed of the lake along various lines could not be executed in row-boat excursions. The time of the small steamers which navigated the lake could not be controlled for such purely scientific purposes. Operations in small boats could be carried on only during calm weather and it required from 30 to 40 minutes to execute a single sounding of 1,500 ft.

THE FAMOUS HORN SILVER MINE.—This famous silver mine, located at Frisco, Beaver county, Utah Territory, and about 225 miles south of Salt Lake City, is described by an expert as the greatest ore deposit he has ever seen. We gather these details from his description of the mine: The mine is opened to a depth of 315 ft., and horizontally for a distance of 350 ft., and at several points the lode has been crossed to each wall, and exposed an ore body 50 ft. in width, the entire crevice being pay ore. There are three kinds of ore in the mine, each kind being separated by a clearly defined line of demarcation. The largest mass is sulphate of lead, carrying about 66 ounces of silver per ton and 45% lead, and occupying three-fourths of the crevice. This body lies on the foot-wall and is called by the miners the smelting ore. The body next to the sulphate is about 17 ft. wide and worth 87 ounces in silver and a small per cent. in lead, it being known as the leaching ore. In color it varies from reddish brown to nearly white, it being light in weight, and in some respects resembles chalk. It contains granular silica, an uncommon form for that mineral, which gives it a mottled appearance. Analysis shows that it contains 47% silica. On the hanging wall is a body of heavy spar that is sprinkled through with spots of ruby, brittle silver and chloride of silver, this body being the richest of the three, the average product showing it to contain 100 ounces of silver per ton, and with a trace of lead. The lode is a contact vein with a foot-wall composed of dolomitic limestone, that in places is changed to marble and a hanging wall of trachyte. It is the only contact vein that has been found in the district, the other veins being either wholly in limestone or granite.

The Carlisle M. Co. of Meadow Lake district have completed a crushing of 30 tons of ore. In the method adopted, the ores are exposed to the action of the air for some time, crushed wet, roasted and amalgamated slowly. The treatment is not a secret, neither is it patented.

A SYNDICATE of capitalists have organized under the French laws for owning, operating and dealing in American mines.

Interesting Facts About Iceland.

[Popular Science Monthly, from a Lecture by Mr. C. G. W. Lock, before the British Society of Arts.]

Concerning Iceland, Mr. Lock stated that the island, so far from being small, as it is erroneously called, is considerably larger than Ireland or Ceylon. Its situation is such that its whole northern coast is shut in nearly every year by the descent of masses of ice from the north. The southern and western shores are affected by ice in very exceptional instances only. The country is essentially volcanic and mountainous; but Hecla, which monopolizes the geographical knowledge of most students on the subject, does not possess a single characteristic to place it above its fellows. The whole central plateau is a wild waste of lava and volcanic sand, and the only habitable parts of the island are a narrow fringe of coast-land and a few of the larger river valleys. The great ridge of ice-clad hills, stretching across the island, acts as a refrigerator to the moisture-laden winds from the southwest, and produces two distinct climates: the northern, generally dry; and the southern, generally wet, and more temperate than the other. The fact that colonists from Great Britain participated in the settlement of Iceland more than a thousand years ago is attested by the identity of many words that are used by the people with British words. Ponies are the chief animal product of the Island. From them the stocks of the "Black Country" of England are recruited. The sheep furnish a fine mutton, and a wool which is made up into excellent fabrics at home, or is exported. Profitable trades are driven in skins, catgut, fox-fur and eider-down; the cod-fisheries are very important, and considerable trade is carried on in cod-liver oil and shark-oil. The salmon-fishery has been shamefully abused by the excessive employment of barbarous methods of taking the fish. It, however, is the one great attraction the island offers to sportsmen; and more profit might be gained, directly and indirectly, by letting out the streams, as in Norway, to English fly-fishers, than by contracting with fish-curers. The island was at one time well wooded, and supplied itself largely, if not entirely, with cereals, but the climate has deteriorated and the soil became sterile in consequence of the cutting away of the trees, and every grain of corn is now imported from Denmark. The principal mineral product is sulphur, which is deposited in a very finely divided state around the volcanic vents by the vapors issuing through them. It is the custom to describe the sulphur mines of Sicily and the sulphur mines of Iceland as somewhat similar, but for all practical considerations they are as distinct as a coal-seam and a forest. The Sicilian mines consist of deposits formed in past geological ages, now lying at great depths, and utterly devoid of reproductive power; the Icelandic beds are the work of to-day, lie on the very surface of the ground, and live and grow with unabated energy, replacing the deposit as fast as it is removed. The area comprised in the Icelandic sulphur districts collectively amounts to, perhaps, a dozen square miles. The sulphur forms a layer of varying thickness, covered by an earthy crust and underlaid by clays containing sulphur mixed with various acids and salts, and is invariably wet, in consequence of the steam condensed within it. The crystals are almost absolutely pure, but impurities are mechanically mixed with them. Other mineral products are gold and silver, which are found in minute quantities, Iceland-spar, pure specimens of which are valued for optical instruments and cabinets, coarse chalcodones and zeolites, lignite, basalt and volcanic products. The manufacturing industry of the country is confined to woolen fabrics, socks and stockings, gloves and a home-spun cloth, which are excellent.

THE LAW OF MUTUAL HELP.—At the Congress of Russian Naturalists, held in January last, Prof. Kessler delivered an address on the law of mutual help, which, he urged, was entitled to a place by the side of Darwin's law of the struggle for existence. Having given a brief sketch of the theory of the struggle for existence, Prof. Kessler remarked that it did not play the only part in organic development. By the operation of the reproductive instinct, there was developed in the different animal races a strong inclination for a closer association of the sexes, as well among individuals as in the whole group, under which the members of a society, of the whole species or family to which they belonged, were impelled to assist each other in the struggle for existence. He had observed numerous instances in which, after the death of the male, the female died, and conversely, or parents with the greatest self-denial sacrificed themselves for the protection of their young. All such examples showed that the reproductive instinct bound groups of related animals to each other through the law he had enunciated. The principle was not limited to sexual association, but was exhibited wherever mutual help appeared to be necessary. As an example, the case was cited of a group of beetles which would combine their forces with severe exertion to drag away a dead mouse. Further, ants and bees illustrate the operation of the law in a high degree. The principle is developed with especial prominence in mankind. Only by the most powerful co-operation could men have succeeded in reaching the degree of civilization which the race has attained.—*Popular Science Monthly.*

MECHANICAL PROGRESS.

Steel for Boilers.

The failure of the steel boilers of the *Livadia* has naturally caused much comment, and while the facts which underlie the case have not yet come before the public, some hints have been thrown out which ought to serve as a warning to thoughtful manufacturers and consumers. As Dr. Siemens, speaking on the subject before a recent meeting, forcibly puts it: "Unfortunately the demou cheapness has settled on the steel trade."

Coming from such a source and at this time, his words sound a warning which ought not to be disregarded. Although in this country the use of steel for general purposes is not by far as extended as it is in England, Americans should observe every phase of progress there closely. The active and untiring advocacy of steel by well-known engineers has borne fruit in the last four years, and there is not one branch of the constructive trades which has not devoted much and careful attention to it. The examination of the product of modern metallurgy proved satisfactory in almost all cases, the only objection raised being that of the price. Nothing would appear more natural on the part of steel makers than an attempt to lower the cost, but nothing is so likely to retard progress than such efforts if made at a sacrifice of quality. There can be no doubt that the aim of steel makers is ultimately to effect in other branches that which they have succeeded in doing in the rail trade—making a better article at the same or at a price little larger than that asked for the product of older processes. How rapidly this period will be reached depends upon the prudence and tact of the makers themselves. By forcing the development of a trade which is naturally of slow growth, much is lost and but little can be gained. The great task of educating consumers requires time. A knowledge of the material, as well as of the methods of overcoming dangers and averting failures, cannot be acquired in a few years. When it is thoroughly understood how to manufacture high grade mild steels, and how to work them in their subsequent use, the step to the introduction of the more ordinary grades will be an easy and a safe one. That period has not yet come, and the action of Dr. Siemens, in protesting against any premature efforts to bring about the age of cheap steel, is well calculated to serve the best interests of all concerned. As yet, American steel makers have been extremely cautious, and are rapidly earning for their product an excellent reputation. We trust that this policy will be strictly adhered to in the future, and that they will not succumb to the temptation of abating their vigilance in the selection of raw materials for the sake of getting for the moment increased profits. We do not wish to urge that the cry for cheap steel be disregarded, but every effort should be made to convince consumers that as yet high grades are safest and best, and that their policy ought to be to exclude, by rigid and comprehensive tests, any deficient or untrustworthy material.—*Iron Age*.

CHAIN FIRE-GRATE BARS.—A boiler in the Birmingham (Eng.) corporation water works, according to *The Engineer*, has for several months been fitted up with the arrangement of a common chain fire-grates, invented by Mr. W. Welch of Ashton Village, near Birmingham. The furnace is six ft. by three and a half, and when the notice was made, had been at work about four months, continuously, night and day, with the most satisfactory results. The chain is arranged to run over drums, like an endless apron; is kept constantly in motion, the feed being made automatically at the front of the grate, precisely as the batteries are fed at many of the quartz mills in this State. When the chain reaches the front, on its under passage, by an additional roller it is made to drop and pass through a trough of water. This may be used or dispensed with as experience may dictate. It is stated that a complete combustion of the fuel is effected without smoke. Thus far the grate has given no trouble, and is as perfect as when first put in. It is claimed for the arrangement that the large and completely distributed air-space area permits the maintenance of a clear, smokeless fire without a heavy draft, perfect combustion being secured. Clinkers do not adhere to the chains.

A NOVEL HORSESHOE.—A manufacturer in Berlin, Germany, is turning out a novel horseshoe made of malleable iron. It is not made solid, but has a deep and wide groove, into which tarred hemp rope is so firmly wedged that it cannot be withdrawn. It is so thick that it protrudes considerably beyond the rim of the malleable shoe. It is stated that the lightness of this horseshoe has gained for it considerable favor in Berlin.

A MACHINE, by which 600 pails can be turned out daily, the sides of each pail being made in one piece, has been invented at Marriacourt, Mass. Round a block of wood shaped like a water pail, the machine cuts off a strip of the requisite thickness for a pail, and of the same length the block itself is. A piece of the strip, of the right length for a pail, is then cut off, the edges tongued and grooved, and a groove cut to receive the bottom.

Electro-Motors of the Future.

The difficulty in the way of the electro-motor at present is rather one of expense than of mechanics. The machine has doubtless been invented and tried on a small scale with a certain degree of success, but costs too much in working. Whether the electricity is developed directly from galvanic batteries or from a magneto-electric engine driven by steam, the expense in either case is greater than that incurred in obtaining an equivalent of power with the common steam engine. This has been proved over and over again, and constitutes the great stumbling block of inventors, though they may refuse to admit it. Must the attempts to produce a practicable electro-motor be abandoned, therefore? Not at all. The desideratum now is to find some means of greatly cheapening the production of the electric current. This should be sought, and probably will be found in some of the universally distributed forces of nature now untutilized by man or employed by him so sparingly. The doctrine of the correlation or interconvertibility of forces is now settled beyond dispute, and it only remains for the electricians to use it and call into being the most brilliant inventions of the future. The sunlight, as Ericsson has proved, is convertible into horse power by radiation and concentration. The wind has a capacity for work which man has but partially tested with his primitive mills. The tides, with their daily rise and fall, are sources of incalculable power now wasted all over the world. Every one of these tremendous natural forces awaits the coming man who will seize upon and utilize its strength, store it up as in reservoirs for use as required, turn it into electricity and conduct the resulting electric current by sufficient wires to points where work is to be done. Zinc and coal, or other substances by whose decomposition or combustion electricity is now produced are expensive. The sunlight, the wind and the tides cost nothing. They are free to all men, and only the competent inventor is wanting to make them do much of the work of the world, including that of steam locomotives—as a substitute for which the electro-motor cannot too quickly come to our relief.—*N. Y. Journal of Commerce*.

FIRE-RESISTING QUALITIES OF BUILDING STONE.—Dr. Cutting, State Geologist of Vermont, has concluded his unique series of tests on the fire-resisting qualities of building stones. He sums up the result in the current number of the *Weekly Underwriter*. He declares, in substance, that no known natural stone deserves the name fire-proof. Conglomerates and slates have "no capability" of standing heat; granite is injured beyond repair by even so mild a heat as that which melts lead; sand stones, including the variety called brownstone in this city, are better, and limestone and marbles are perhaps the best in this respect. But even they are injured by continuous heat of 900°, and at 1,200° are changed into quicklime. Therefore it would seem that no stone buildings are fire-proof, and some of them, Dr. Cutting even says, are as much damaged by fire as wooden structures are. Brick, on the contrary, is usually uninjured, and is often rather improved by heat until it is melted. But as most brick buildings are trimmed with iron or stone, the damage is often considerable, even when the walls stand. To avoid this, Dr. Cutting recommends soap-stone trimmings, which are open only to the objection of expense. But although brick stands heat so well, it is objectionable, because its power to resist pressure without crumbling from dampness or frost, is less than that of stone. Nevertheless, as brick is in fact only a kind of artificial stone, the search for an ideal building material is not hopeless, but it must be prosecuted rather by the maker than by the quarryer of stone.

AN IMPROVED ELECTRIC MOTOR.—M. Marcel Deprez, a well-known electrician, has brought out an improved electric motor, in which a piston of soft iron is attracted up and down in a hollow cylindrical electro-magnetic coil, with a motion like that of an ordinary steam-engine piston. This principle is not new, having been employed by Page, Bourbouze and Du Moncel in the construction of electro-motors. The novel point, however, about the motor of M. Deprez, is that the magnetism of the soft iron core is never either reversed or interrupted. This was the weak point of the earlier machines, but it has been obviated in the new form by the device of dividing the solenoidal coil into sections like the separate coils of the ring armature of the Gramme machine, the current being thus transmitted first to one part of the cylindrical coil and then to another. The commutator, which distributes the current successively to the various sections, is worked by an eccentric on the shaft of the fly-wheel in the ordinary way, but the "lead" does not require to be so much as a quarter of a revolution.—*The Iron Age*.

SCISSORS, the parts of which are still made in Sheffield, Eng., by a tedious hand process, are made at one stroke of a die in Connecticut. Hence, Sheffield sends to Connecticut for large quantities of steel blanks, which are forwarded in that form to Sheffield to be finished, and then returned to supply American customers, who will not be satisfied with anything but English-made scissors.

SCIENTIFIC PROGRESS.

American Astronomical Work.

The progress of science in the United States cannot be better illustrated than by a brief review of the astronomical work now in progress, and the instruments at the command of those making observations in this country.

Taking as our authority the "Report on Observatories," published by the Smithsonian Institution, and the "Annual Record" prepared by Prof. Edward S. Holden, of the U. S. Naval Observatory, Washington, we find that in 17 States Astronomical Observatories are located, varying in degree of importance from the National Observatory at Washington, to the possessor of a two-inch achromatic telescope of its owner's own make. The work done with the latter instrument being most instructive as showing how much really good scientific work can be done with limited means when directed by intelligence well applied.

The State of New York can boast of 12 observatories, Michigan four, Pennsylvania three, Massachusetts, Connecticut, Ohio, Missouri, Iowa, each two, and Tennessee, California, Mississippi, Minnesota, Indiana, Kansas, Illinois, Maryland have each one observatory. It will thus be seen what an immense territory is covered by American astronomers, ranging from the shores of the Atlantic to the Pacific coast, and from the tropical regions of the Gulf of Mexico to Lake Superior on the north. Many of these observatories are supplied with requisites appliances of the most perfect description, while all, with one exception, have at least a good achromatic astronomical telescope. * * * Among the largest equatorials directed nightly to survey the heavenly bodies may be mentioned the great 26-inch instrument, by Messrs. Alvan Clark & Sons, at the Naval Observatory, at Washington, under the charge of Prof. Asaph Hall (who has already made such important discoveries with it), assisted by Prof. Edward S. Holden; the Dearborn Observatory at Chicago possesses an 18½-inch equatorial (Alvan Clark), and the Harvard University employs a 15-inch equatorial by Mertz.

This powerful battery of astronomical telescopes of the highest excellence might seem to be sufficient for one nation, but the national spirit of American enterprise appears to be strongly infused into this great branch of scientific research, for new astronomical telescopes of mammoth proportion and exquisite perfection are now in course of construction for United States observatories, which, in the hands of the able astronomers ready to receive them, will doubtless add to their already well-earned fame and the prestige of science in this country.

With these facts before us, we read without surprise the note of Prof. O. Stone in our last issue, in which he says of a recently published "Record of the Progress of Astronomy during the year 1879," by Mr. Deyer, of Dublin, one-third of the memoir is devoted to the result of astronomical work done in the United States.

An article on this subject would be incomplete without a reference to the very perfect work of Messrs. Alvan Clark & Sons., of Cambridge, Mass., who appear to have distanced both the English and the Continental opticians in the excellence of their objectives, and who have secured to the United States the honor of supplying the objective for the great equatorial to be manufactured for the Russian government, to be used in the Pulkova Observatory by the distinguished astronomer, Otto Von Struve. We also notice that of the 40 observatories recognized by the Smithsonian Institute, 17 have telescopes made by this firm. In regard to the work now in progress at the Messrs. Clark's establishment, it may be stated without exaggeration that the world awaits with eager expectancy the result of their labors.—*Science*.

THIN ROLLED IRON FOR SCIENTIFIC PURPOSES. In experiments made at the Alleghany observatory, by Prof. Langley, on the measurement of radiant heat, he made use of a thermo-electric apparatus, a product of the American iron industry. Observations made with such instruments have shown that iron in extreme thinness is the most suitable material to be used with them, and in order to supply the demand, the Pittsburgh mills have succeeded in manufacturing rolled iron which is so thin that from 10,000 to 12,000 sheets laid on each other equal only one inch in thickness. An instrument made out of this material has almost the same responsiveness to radiant heat which the eye has toward light.

TO REMOVE THE OOR FROM BENZINE.—Mr. R. F. Fairthorne suggests, in the *American Journal of Pharmacy*, that if three ounces of powdered quicklime be added to a gallon of benzine, and the mixture be well shaken, most of the peculiar sulphureted odor of the benzine will be removed; and articles that have been washed in it will have no disagreeable smell.

HOW FLOWERS ARE RENDERED LUMINOUS.—We have already called attention to the preparation of luminous flowers which glow in the dark, and which are the latest elegant novelty offered for sale on the Paris boulevards. They are reported to have been rendered phosphorescent by coating first with a transparent size, and then dusting them with the phosphorescent salts of calcium or barium.

Danger in Toughened Glass.

Several accidents have recently been reported of the sudden explosion of drinking glasses made of toughened glass, one of which we give below as communicated to the editor of *London Nature*: A lady of my family emptied a powder composed of 7½ grains of carbonate of potash and 7½ grains of carbonate of soda into a tumbler of what is called toughened glass less than half full of cold water. After stirring the mixture she drank the contents, leaving a silver teaspoon in the glass, and then placed the empty tumbler on the table by her side, within, perhaps, a foot of a burning duplex lamp. About five minutes afterward a sharp explosion occurred, which startled all in the room. We found the tumbler shattered into fragments, the body of the glass ripped up, as it were, into several large, irregular-curved pieces, and the bottom of the tumbler broken into small pieces more resembling thick, rough ice than anything else. Query: Was the explosion caused by the inherent properties of the toughened glass, or by the contact of potash, soda, the silver spoon and proximity to a lamp, the heat from which was very slight; indeed, scarcely perceptible to the hand at the spot where the tumbler stood?

The accident might have been very serious, for pieces of the glass flew to within a very few inches of the lady's face. A solution of the cause of the explosion is therefore of considerable importance to all who may have occasion to use vessels of this peculiar glass.

We have not, as yet, seen any solution of the cause of such explosions, one of which occurred while the glass was yet in the hand of a person who had just quaffed its contents. We may remark, however, that toughened glass when broken does not present sharp edges, or points, as is the case with ordinary glass by which it is rendered more dangerous. Toughened glass breaks very much as does glass that is suddenly cooled, as Prince Rupert drops, which may be safely exploded in the hand and the broken fragments rubbed and handled almost as safely as so much coarse sand. The "explosions" probably arise from a sudden fracture of the outside skin of the glass, which from some reason in cooling, is drawn tight over the inner mass. In Prince Rupert drops that condition is caused by a sudden cooling of the outside by dropping the molten glass into water. Chilled cast-iron car wheels have been found in a condition under which a moderate blow from a hammer upon the face of the wheel has caused them to burst into numerous fragments.

A TABLE LAND ACROSS THE GULF STREAM. In a recent dredging expedition from Charleston, S. C., across the gulf stream, Commander Bartlett, of the United States Coast Survey steamer *Blake*, was surprised to find the depths much less than he expected. This induced him, although the trip was one primarily for dredging, to extend the work of sounding; and he accordingly ran a line of soundings nearly along the warmest band of the gulf stream, commonly called the axis of the stream, for a distance of 150 miles from latitude 32° to latitude 33° 30' north, on which he obtained depths varying from 233 to 450 fathoms, where it was supposed that the depths would range from 600 to 1,000 fathoms. At the northeast end of this line, in about latitude 33° 30' north, the depth suddenly increased, in a distance of 15 miles, from 457 to 1,386 fathoms. These depths obtained by Commander Bartlett appear to indicate that a submarine table land may extend from the coasts of North and South Carolina across to the Northern Bahamas. The development of this table land Superintendent Patterson proposes to have completed next spring, when the weather will be better adapted to such work than in the autumn and winter months.

THE MEXICAN CALENDAR STONE.—A Mexican archaeologist, Señor Alfredo Chavero, has written a book to prove that the famous Aztec "calendar stone" was never intended or used as a calendar. His study of Aztec hieroglyphs leads him to the conclusion that the stone was an altar of the Mexican sun god, and the characters, hitherto supposed to be signs of the zodiac, are records of Aztec cosmogony and theogony. When they are fully interpreted, he says, we shall know positively what progress the Aztecs had made in science and religion.

SUBMARINE TELEPHONE EXPERIMENTS.—A despatch from Paris, Saturday, August 14th, says that in the telephone experiments made on the submarine cable from Brest to Penzance, the Bell, Phelps, Gover, and Edison telephone systems were all applied and failed to work satisfactorily over the circuit. The new invention of Dr. Herz for telephonic communication over submarine wires proved a success.

TO REMOVE ARSENIC FROM SULPHURIC ACID. The purification of sulphuric acid from arsenic, which is frequently present in acid made from pyrites, may be effected, according to Telnic (?), by diluting the acid with half its bulk of water, and distilling after the addition of some plumbic chloride. All the arsenic, according to this author, goes over with the first portions of the distillate. In medico-legal investigations, this procedure may prove very useful.

NEW PHOTOGRAPHS OF THE MOON.—Mr. George Berwick, it is stated, has taken a series of photographs of the moon on very sensitive plate—the bromo-gelatin. One of the plates shows three well-defined rings around the moon. Whether the rings are due to comical, atmospheric, chemical or optical causes is not known.

which is said to be very rich with gold. This is probably the most extensive mining enterprise ever begun in this county.

EL DORADO.

MOUNTAIN VIEW.—Placerville Democrat, Sept. 4: Mr. Geo. W. Kimball informs us that the incline of this mine, near Gold Hill, is now down 90 ft., and the ledge is increasing in width and not decreasing in richness. The rock runs all the way from \$200 to \$1,000 per ton. A mill will soon be erected.

NOTES.—Prof. Tuck, a gentleman of extensive experience among mines in California and Nevada, came to Shingle Springs a couple of weeks ago, and immediately located a quartz ledge. He already has a portable steam mill on the ground, and will prospect his ledge thoroughly. If unsatisfactory, he will try some other point. This is a practical way of working, which commends itself to all sensible men.

MILL TREN.—The mill on the Reid mine has been leased and will be fitted up for the purpose of crushing a quantity of rock from the King-Island. Should the result prove satisfactory, it will be doubtless a substantial mill will be at once erected on the ground adjoining the mine which has been secured for that purpose. The mortar for the additional 5 stamps at the Chaparral was cast the other day at the Placerville foundry. The contract of the Grand Victory—successor to the Gross mine—is for a complete 50-stamp battery. This is in addition to the 30 stamps now at work. The 10 stamp mill for the latter is being pushed as rapidly as possible.

MAXWORTHY CREEK, FLUKE.—This mine is through the tunnel at the fundry, and rapidly extending toward Coloma street. Every precaution is being taken to hold it firmly to the bedrock. At the head of the tunnel a substantial stone bulkhead will be built, and a gate put in to guard against floods.

NAVYVILLE MINE.—Cor. Mountain Democrat, Aug. 29: The water is very low now, but there is still water enough in it to keep flat & Grindle's mill pounding away on good paying ore. Capt. J. M. Day, of San Francisco, has some men at work on his mine, the Little Mary, 2 miles east of here. It is an extension of the Central mine, and prospects equally as well as that.

KERN.

SLATE HANCO MINE.—California, Sept. 2: Old residents of Kern county may recollect the excitement which prevailed some 15 years ago about this district, lying in the midst of a vast desert region about 50 miles east of Walker's pass. Numerous ledges of unworked values were located, and many of them sold for what were considered great sums in those days. But the scarcity of wood and water, and the wide stretch of desert to be traversed in reaching them, were discouraging circumstances in the way of working them, and the excitement gradually died out. Later attention has been directed to the neglected district, and we learn that J. W. Searies, one of the discoverers, has sold a mine there for the sum of \$125,000. The 8th parallel railroad will pass through the district.

MARIPOSA.

YORKVILLE MINE.—Gazette, Sept. 4: We learn from Mr. J. W. Wilcox, who has just returned from a visit to the works of this company, near Florissant, that its 30-stamp mill will be one of the best he has ever seen. The distance from the mine to the mill is 4,000 ft., over which is constructed a railway laid with heavy T-rails, with improved automatic iron dump cars. The splendid mine of the company is in fine condition. The main incline shaft, which is 250 ft. deep, is newly timbered with redwood 12 inches in diameter, shipped from San Francisco. There is on hand already for crushing 3,000 tons of ore. The vein of gold at the bottom of the incline has taken a sharp pitch to about 50°. The main body of ore at the bottom of the shaft is 7 ft wide between clearly-defined walls.

NOTE.—During the past week, Mr. J. D. Coghlan, accompanied by a mining expert, has visited Little's Cove and the silver region a few miles southeast of this town, and has expressed his astonishment that such promising property should be permitted to lie dormant. Mr. Coghlan is a San Francisco capitalist, and he is highly impressed with the mining interests of Mariposa.

MONO.

BODIE DISTRICT.—Standard News, Sept. 1, gives these last official reports of the following mines:

SOUTH BOWEN.—Prospecting for the purpose of establishing the size of the ledge in the north drift by crosscutting at intervals of 50 ft., has developed a magnificent ledge 12 ft wide, carrying an ore vein of good milling ore about 6 ft wide. The Miller ledge never has shown a better indication of permanency and a well-defined ledge than at present. The quantity of milling ore in sight is estimated at 5,000 tons.

BOSTON CO.—The bottom of the winze is in vein matter with no change for the week. The upraise on the 200 level, from which the stope is started, is 22 ft high, and carrying a vein from 2 to 3 ft wide, showing ore extremely rich in gold. The stope is being extended, and at every point are looking well.

SOUTH NOONDAY.—There is little change to note, except that the clay seams in the crosscut running west on the 150 level, which has been advanced to a total length of 107 ft, appear to concentrate. Such indications are now shown ought to prove the existence of, and the near approach to a fine body of ore. This will probably be struck in the sand bank ledge.

WOMER.—The ledge has widened to 4 ft, nearly all ore and showing free gold. The walls are well defined, carrying heavy clay partings. The main tunnel, on a line with the Greyside ledge, averages 2½ ft of ore of a milling grade.

TIGRA.—The rock at the bottom of the shaft is very hard, and breaks quite short. There is a slight increase of water.

PACIFIC.—The station at the 600 level is completed, with a run of ladders connecting with the surface. The cable will next be removed from the north to the south compartment, safety cages inserted, machinery overhauled, preparatory to exploring the lower level.

LAKE DISTRICT.—We learn from William Welsh, Superintendent of the Glyn-Dale mine, that the prospects of the Mammoth company are excellent. The mine never looked better, and the mill is running steadily to its full capacity, and is crushing 84 tons of ore per day.

MONTICRISTO TUNNEL.—This tunnel has passed into a fine vein formation, and all indications in the face show its near approach to the Mammoth ledge, and this may be cut at any moment. The tunnel is now in about 1,000 ft. and will cut the ledge at a depth of 900 ft from the surface.

LISBON.—This is another outcrop extension of the Mammoth ledge. They have a good vein and are now working the ore extracted with an arastra, the rock being very rich in gold.

NOTES.—The adjoining mines are waiting for developments in the Mammoth, Headlight and Monte Cristo. There are now about 300 men at work in the mines and timber. A great deal of work is now being done on Laurel hill, with good prospects.

BISHOP CREEK.—Mammoth City Herald, Aug. 28: Charles Schumann, who has just returned from Bishop Creek, informs us that the Red & Boggs ledge, which is in the upper tunnel of their mine, which looks and prospects well. Numbers of specimens have been taken into Bishop Creek, and quite a little mining future is ragging there in consequence of the strike.

MILL NOTES.—A 10-stamp custom mill is about to be erected at Fish Springs. The company has purchased Antelope springs to supply the mill with water. Another 10 stamp mill is being erected at Keeler City, at the head of Owens lake, near the Cerro Gordo foothills mines, discovered about a year ago.

HOMER DISTRICT.—Index, Aug. 28: The May Lundy mine presents a busy scene just now. The working force is being rapidly augmented and operations are being extended with all possible dispatch. Last Sunday the main vein was struck in the tunnel, which is now 320 ft from the mouth. The strike was made a little more than 300 ft in. The vein is fully 4 ft wide, all clear ore of extraordinary richness. This striking the vein so large and so rich at a depth of 320 ft will settle the doubts of even the most

captious regarding the permanency of the mine. Ore is being extracted from the tunnel faster than the pack train can take it away, and the number of mules is to be increased next week from 10 to 30. The company is now negotiating to let a contract for packing down 1,200 tons of ore to the mill, the contract to be completed by the 15th of Sept.

NOTES.—Messrs. Land & Owens have let a contract to Mr. Jones for making a trail to the little Enant mine, and the work is now in progress. Ore is being taken out of the mine for shipment when the trail shall be completed. Jack Fallalain is busy getting his 1-stamp mill in running order. He expects to have it ready to commence crushing by the middle of next week, when it will start up on May Lundy ore.

NEVADA.

STRIKE IN THE BANXER.—Transcript, Aug. 28: For 3 weeks past 3 shifts of men have been at work putting things in shape in this mine, east of this city, to resume the systematic working of the claim. They have cleaned out the old Stiles & Tisdale incline, which is 100 ft deep, and run a drift 10 ft. In the face of the latter a 5-ft ledge of good-looking ore was encountered yesterday. As soon as the prospect of the ground is completed, if everything is satisfactory, the mine will be worked on an extensive scale.

NORTH END DISTRICT.—Kirkham & Hitchcock, at their Blue Tent claim, are now putting in a 4-inch Cornish pump, which will be run by a hand-wheel. Next week sinking for the 24 level will begin. One man has been engaged in stopping for 2 weeks past, taking out \$1,000 in silver.

SOUTH YUNA CO.—We are informed by the foreman of this company that the water supply will last this season till Nov. Lat, with 6,500 inches running in the main ditch steadily. It was not necessary this season to draw on the lakes till the 3d inst., whereas that is generally done early in July. The supply for all purposes will continue till a later date this year than ever known before.

GARRETT LODES.—Nevada City Herald, Aug. 28: Some good-looking rock is being taken from this ledge, situated near the Thomas mine. The quartz shows plenty of free gold and sulphurets. The ledge averages from about 6 inches to 1½ ft in width.

CORINTH MINE.—This mine, situated on Gillespie's ranch, continues to improve. About 1 ton of very good-looking rock is being crushed daily at this claim. The ore is of a fair size and contains both rich sulphurets and free gold.

FORTUNA MINE.—Work at this mine is progressing favorably. The principal labor now being done is drifting, sinking in the shaft having been stopped for several days. The company is taking out some good ore, and the ledge continues to improve both in size and quality the further they advance.

CLARK CREEK.—Oress Valley Union, Sept. 1: All of the rich specimens taken from the Rocky Bar mine last week, amounting to 750 lbs, have been run through the batteries of the mill, giving, in retorted gold, 667 ounces, worth \$17 per ounce, or a total of \$9,650. During the present week the ledge from which this rock was taken is being stripped, and it is not unlikely that more specimens will be brought to light when the miners come to "take up the law." A crushing of 10 loads of tribute rock has just been run through the mill, that gave a yield of \$40 per load.

ROSE HILL LEDGE.—This claim, on Winchester hill, gives promise of being a good mine. The first crushing, under last November's 5 loads, gave 2½ ounces of bullion, of the value of \$480.50. The next crushing was made in February, of 20 loads, which yielded 150 ounces of bullion, of the value of \$2,551.25. In June there was another crushing of 23 loads, yielding 182½ ounces of bullion, amounting to \$3,056. The deepest shaft is about 60 ft.

PURIFICATION LEDGE.—This crosses the Rose Hill ledge, and has 2 shafts, one 40 ft and the other 50 ft deep. From one of the shafts a crushing of 23 loads of rock was made in the early part of August, which gave a yield of \$694.75, or over \$30 per load. A crushing of 4 loads of tribute rock, and 4½ ounces of bullion, or over \$25 per load.

At the points where these shafts are sunk, the ledges are close together, and crosscuts connect the workings.

ALASKA.—George Mainhart has taken a 2 years' lease of the Alaska mine, of which he was a long time foreman. He is now getting the mine in shape to commence the extraction of quartz.

REPUBLIC.—A contract has been let for sinking the incline of the Republic mine 50 ft deeper. It is now down about 125 ft. A ledge 1 ft in width, of good-looking quartz, now shows in the shaft.

CONGREY.—No. 3 level of this mine is now being opened. The mine is now producing 60 tons of gravel per diem, and the 8 stamps of the mill are kept constantly at work.

PLACER.

DUNCAN HILL NOTES.—Auburn Herald, Sept. 4: Cwynn & Coode are driving in on their lead in Duncan hill, and are getting some very encouraging prospects. The rock shows free gold in many places, and all prospects rich. T. J. Hunter is getting his works in shape to follow the pay chute, when he expects to astonish the neighborhood with some more rich rock. Shurfield is still sinking on his ledge on the west side of the hill, and as he goes down continues to take out rich rock. This shaft, on the west extension, is now down about 110 ft. All the ledges on Duncan hill show well, and the manner in which some of them are now being developed indicate lively business in that section for the future.

PLUMAS.

SPANISH PEAK.—Quincy National, Sept. 4: During the past week very important strikes have been made in the Spanish Peak mine, which bids fair to open a section of the "old reliable" Blue Lead. The tunnel is underground some 1,000 ft, and is too high—that is, above bedrock some 12 or 15 ft. A shaft sunk from the head of the tunnel last week, developed about 3 ft of beautiful blue gravel on the bedrock, and the prospects obtained from it were wonderful, ranging from \$250 to \$5 to the pan. The rock is so rich that 20 can readily be seen in it.

OLD BLUE LEAD MINERS who have been on the ground say that it beats anything they ever saw in the blue-lead claims of Sierra county. The indications are strong that the gravel body is continuous and extensive, and there is every reason to think that several miles of the channel will be found intact under the lavas.

GREENVILLE NOTES.—The Acadian company has struck another large chimney of rich rock, and while prospecting for it they have taken out some \$3,000, which pays for all expenses and improvements.

CHEROKEE.—This company has erected large hoisting works near the old Kettle shaft. The building is 24x75 ft. The company has some 25 men employed on the Bellas mine. It is only a question of time when Cherokee will be in full working order.

COLD STRIKE.—This mine is now running 35 stamps on good paying rock.

MILL NOTES.—The Green Mountain mill, near the Crescent, will soon be completed. The mill, the large new boarding house and several miners' cabins near the new mill site, make a lively looking little city. The New York mill is running on the Red & Boggs ledge, and the ledge is in the upper tunnel of their mine, which looks and prospects well. Numbers of specimens have been taken into Bishop Creek, and quite a little mining future is ragging there in consequence of the strike.

SHASTA.—French Gulch.—Reading Independent, Sept. 2: The French Gulch district still continues to attract more or less attention. The Scorpion mine, under the management of McNevin, shows a large body of rich ore. There is talk of having the Washington mill crush a few tons of rock for test. An old tunnel, run into the mountain by the former proprietors of this mine, will be cleaned out and an attempt made to tap the ledge 100 ft below where they are now working.

LARGE YIELD.—We are informed by reliable parties that

a gentleman in Deadwood recently crushed 8 tons of rock, from which he cleaned up \$4,000, or an average of \$500 to the ton.

CENTREVILLE NOTES.—As there will be a sufficient amount of water here in a short time to supply the many miners of this vicinity, it will give them a chance to develop their mines, which have not been worked for the last 2 seasons for the want of water.

BUCKLEUP.—At this camp, Waupla & Lockhart have struck it rich. After sinking about 80 ft on their ledge with not very flattering prospects, they have at last come upon rock that pays 25 cents to the lb. The ledge is 2 ft wide, and as it goes down widens out like an inverted ledge. Big Charley, a miner in this locality, recently run 15 tons of rock through his arastra, cleaning up \$582.

SIERRA.

CALIFORNIA CO.—Downville Messenger, Sept. 4: This company, south of Table Rock, is employing 20 men, and find an abundance of pay gravel. Their tunnel is in 3,000 ft, 1 of which through very hard rock cost \$25 per ft to run. Work is vigorously prosecuted night and day.

FOREST CREEK.—The rock in this mine, near town, is found to be richer as they go in. The ledge is also widening out. This was a blind ledge, not showing on the surface at all.

BLICK GRAY CO.—This company, located 3 miles east of the 1001 mine, has struck blue gravel in their tunnel. They have only run a little over 100 ft, striking the lead on the end.

THE 1001 MINE.—The gravel in this mine is looking and prospecting better as they advance. The bedrock is becoming better and better, but very slightly. This claim bids fair to be not only one of the most extensive, but one of the richest in the county.

NEVADA.

WASHOE DISTRICT.

EXCHEQUER.—Cor. Virginia City Enterprise, Sept. 1: During the week have cut 350 ft water drain and relaid 300 ft of track. Have advanced north drift, 2510 level, 8 ft, making total length of same to date 42 ft. Face of drift all quartz. Started another drill hole north 10° east; are in about 60 ft. We have struck water, which comes out with such force as to prevent us from advancing.

SAVAGE.—During the past week we have completed the work of retimbering the main incline, having retimbered 18 ft. Have also retimbered 5 ft of the main shaft. Continued east crosscut, 1300 level, 6 ft, and then stopped drifting it. Commenced driving northwesterly upon the same level, and have driven 27 ft, through mixed ground of quartz and porphyry. Have been engaged in putting in a new tank at the 2000 level, which is not yet completed.

CALDONIA.—The pump has been run an average of 17½ hours per day. Have pumped Belcher water a part of the week. Forman shaft has been sunk and timbered 20 ft; total depth, 1,380 ft. Rock continues very short and tough. Water has increased considerably.

CON. IMPERIAL.—No. 3 crosscut west, 2810 level, 350 ft north of the main winze, is in 35 ft; face is hard porphyry. Very little work has been done in the Imperial during the past week, as we are employing most of the miners in the Exchequer mine.

OVERMAN.—The winze from 1900 level has been sunk 20 ft; total depth, 86 ft. Forman shaft has been sunk and timbered 20 ft; total depth, 1,380 ft. Rock continues very short and tough, and water has increased considerably.

CHOLLAR.—The diamond drill has been run 150 ft in a southwesterly direction from a point in the Chollar south drift 500 ft south of the main west drift, and through porphyry, clay and quartz.

GOLD & CURRY AND BEST & BECHLER SUAPT.—Have sunk and timbered the shaft during the past week 25 ft; total depth, 1,555 ft.

BECHLER.—Preparing to put in the new pump-rood.

CAYOUSTE.—Hill City News, Sept. 8: The joint Ophir crosscut east, on the 2000 level, is making usual good progress; no change in material to note. The joint Ophir raise from 2300 level is advancing as usual. The north drift on this level, to connect with the workings south from the Ophir line, is averaging 3 ft per day. The stope on the 1050 level continues their yield of fair-grade ore.

ORIN.—The south drift on the 2500 level, toward the C. & A. shaft, is averaging 4 ft per day, and is without particular change. The drift on this level north and east is making usual progress, and is following the streak of heavy vein matter which was cut in running east from the incline.

BRISTOL DISTRICT.

BRISTOL CO.—Pioche Record, Aug. 28: The company's mill dropped stamps on the 25th. The roaster and everything connected with the mill is running smoothly. A large assay office and retort-room will soon be completed, and when finished they will be the finest ever erected in the county. About 25 tons of ore are being handled daily from their mines, and this amount can be doubled any time.

HILLSIDE CO.—The furnace of this company was started up last Tuesday, and is running nicely, turning out the usual quantity of bullion. There is quite a large amount of coal and ore on the dump, and there is every prospect for a long and continued run. A new cupel furnace is about to be put up, so that they will have facilities for refining all the bullion. Work will commence upon it tomorrow. Both of the mines are looking well and turning out their usual amount of good ore.

IRON MINE.—Chris. Kastberg has sold this mine, located in this district, and the ore is now being reduced at the furnace. It is looking well and turning out 5 tons of good ore per day. It is very fine smelter ore, carrying from 40% to 60% lead. The ore is mostly carbonate, with some siliceous. A good road is already completed from the mine to the furnace.

DUN GLEN DISTRICT.

DUN GLEN.—Silver State, Sept. 4: The Lang Syne mill, at Dun Glen, is running steadily day and night, and the ore is said to be paying handsomely. The ledge, which almost run down to a seam for several ft, has opened out again, and is now 3 ft wide in the drift, and carries very rich ore.

EUREKA DISTRICT.

WALLES CO.—Sentinel, Sept. 1: We are informed by Supt. Griffith that the rumors of a development in the Wales Co. are true. About 10 ft of ore, mostly low grade, has been encountered in the east crosscut from the 300 level. There are some rich streaks and spots in it, but the mass as a whole is not high grade. Assays have been obtained ranging from \$43 to \$226. The extent of the find has not yet been determined, though it is regarded as very important. The mine is being worked day and night.

ZULU MINE.—An important strike has just been made in this mine, situated south of Ruby Hill. On the 45 level a vein of ore 2 ft thick has been encountered, which is extraordinarily rich. The specimen are said to be the finest met with in this section in a long while. The main shaft was reached at this level, and a crosscut was started, and has been started for the ledge. There is no doubt that the vein found above will be cut by this crosscut as soon as it shall have been advanced a little further. All in all the Zulu is a promising property.

GALENA DISTRICT.

MINING NOTES.—Winnemucca Silver State, Aug. 31: Frank Drake, formerly Commissioner in this county, arrived in town last night, from Galena, where he has been engaged in mining for 11 years past. He says the Galena mines are attracting considerable attention, and Eastern companies are investing there. He has sold an interest in the Silver Point mine, adjoining the North Trinity, for \$5,000, and he expects to realize 10 times as much from another location which he owns on the same lead.

CENTRAL ORE.—A lot of ore from Central was taken to

the Humboldt reduction works yesterday. We learn that there is plenty of ore at the Teamster and other mines in Central that will pay the owners to have worked here.

MINERAL HILL DISTRICT.

MINING NOTES.—Cor. Eureka Sentinel, Aug. 29: Matters at this place are progressing quietly but steadily. The company is working its mines with good results, and has somewhat increased its working force. They sort the ore, and will make the first run on rich rock. When the stamps are dropped it will be on a quality of ore which will make the returns both mild and heavy. Mr. George Buchanan is still working his property single-handed, and is doing better, probably, than any wages-laborer in the State. The vein is small, but he puts in every day, Sundays excepted, and, it is claimed, cleans up an average of \$4 per day the year round.

PHILADELPHIA DISTRICT.

MINING NOTES.—Belmont Courier, Aug. 28: The mines of this district—the Belmont, Highbridge, Monitor-Belmont, El Dorado South and a number of others—have yielded large quantities of rich ore above water level, all but the Belmont are shut down at present. The Belmont is never out of ore. There is a well-defined, mineral-bearing ledge in the 600 level, but the ore is of a low grade. The other mines have well-defined ledges, carrying ore, dipping the same way as the ledges do in the Belmont. The Belmont has 3 or 5 of these companies, by putting up heavy machinery and sinking a shaft to a depth of 1,500 or 2,000 ft, could thoroughly develop their mines, with as fair a prospect of striking a bonanza as any mine in the county.

PIOCHE DISTRICT.

DAY MINE.—Record, Aug. 28: The last official report says that the body of the 300 level is still holding its own; which looks well for another continuation of ore. Crosscut in east winze shows well, and as they advance more ore is coming in the face. The 400 level crosscut shows bunches of ore and looks more kindly. The 400 level looks about the same as last report, finding bunches of ore out across an open fissure, which looks well; face in ore and spar, and very strong. Main shaft advancing fast, considering the nature of the ground.

SPANISH BELT DISTRICT.

BARCELONA MINE.—Belmont Courier, Aug. 28: We visited this property lately, and found them engaged in improving the ventilation of the works. There is a solid ledge in the north crosscut, 4 ft of which is mineral of a high grade, rich in sulphurets and carrying a good percentage in gold. This ledge widens as it goes down and the ore improves in quality. A winze will be sunk from the 300 level as the connection is made, and the tunnel section continued to the Barcelons Core incline, at the bottom of which is a 12-ft ledge rich in sulphurets. The prospects in this mine warrant the erection of a mill, and the sooner it is built the better it will be for all concerned.

ARIZONA.

GLOBE DISTRICT.—Silver Belt, Aug. 23: Mr. Morehouse, the master carpenter at the Nugget mine, informs us that it is looking better than ever. He showed us some very fine ore taken from the bottom of the shaft, 120 ft down. The ledge is nearly 3 ft wide, and every particle of it is in good milling ore.

GERMAN FRIEND.—Mr. Hayse has laid upon our table some specimens from this mine. They are coated with horn silver. Upon this ground and in its immediate vicinity, large quantities of almost pure silver float have been found. Mr. Hayse's books show that \$3,000 have been taken out of the mine at a cost of \$150, independent of 500 ft of rich float.

NOTE.—They have struck high grade ore in the Anything mine, near Ramboz camp. This is an extension of the Diana.

PINAL DISTRICT.—Cor. Silver Belt, Aug. 25: The Silver King is still looming up. They have considerably increased the number of underground miners, and continue to send up quantities of rich ore from their bonanza. Their new machinery, and the improvements on the improvements on the dump facilitates labor.

NOTE.—A good deal of mining and assessment work is being done in this district, but there are many men waiting and seeking for employment.

EUREKA DISTRICT.—Yuma Sentinel, Aug. 28: We learn that the mines in Eureka district are attracting capital, and there is a strong probability of great activity in that section this fall. These mines are known to be rich as far as developed, and in availability they cannot be surpassed, wood, water, labor and transportation being within easy reach and cheap. A judicious expenditure of money upon these mines will undoubtedly develop immense wealth, and insure a splendid net yield to investors.

TURKEY CREEK DISTRICT.—Prescott Miner, Aug. 27: We were to-day, shown some pulp from the first run of the new mill on Turkey Creek, belonging to the new mill of the Arizona Co. mill and mining company. In fineness it is fully equal to the product of any stamp mill that we have ever seen, yet we are informed that the machinery is capable of reducing to a much finer powder if necessary. The machinery used in this mill is new, not only to Arizona, but to the entire Pacific coast; it has, however, been largely used in Eastern quartz mills with the most satisfactory results.

ANTELOPE PEAK.—Phoenix Herald, Aug. 25: A Mexican named Losaro found recently on the west side of Antelope Peak, 15 miles north of Wickenburg, a gold nugget weighing 12½ ounces, and valued at \$220. Antelope Peak is a well known placer ground, and thousands of dollars have been taken from it.

BIG BUG DISTRICT.—Prescott Miner, Aug. 27: A correspondent of the Chicago Economist, writing from Big Bug (near Prescott), July 14th, gives a glowing account of the richness, number and size of the mines on Big Bug, together with the mills in progress and prospect. The writer predicts that when the A. & P. R. E. is completed, Big Bug will become another Eureka. The writer is in business activity, and is much more daring in reason of the vertical and fissure character of the ore deposits.

IDAHO.

LEMIN COUNTY.—Yankee Fork Herald, Aug. 28: The Bachelor lode lies nearly 3 miles easterly from Custer hill and on a parallel ridge. One of the owners brought down some of the ore this week. It is the same character of quartz as that of the Custer and adjacent mines, and the specimens shown us were full of silver sulphurets, worth from \$800 to \$1,000 per ton. The prospect shaft is down 30 ft, and at different points in it come very high grade ore is encountered.

WOOD RIVER.—Bellevue cor. Idaho City Statesman, Aug. 15: The mines about this place are looking very well. Good reports come in from all the camps in this vicinity. Ketchum and vicinity is looking well. Col. Shepherd at Galena has struck a large body of fine ore in 2 of his ledges at Galena, 1 of which assays \$17,000 to the ton. Many of the miners are shipping ore to Salt Lake. Among those are Messrs. Pease & Taylor, of Galena; Johnson & Co., of Minn. Tooth; Root, of Ketchum, besides several from Boy's gulch near this place.

NOTE.—I have visited a great number of mines in all the camps in this country, and as I go from one to another am only confirmed in the opinion expressed in my former letters, that this country will, in a very few years, astonish the world with its richness.

DOUGLASS COUNTY.—Idaho City World, Aug. 27: Jas. Irwin and Ben Miller discovered a lode the other day on Crooked river, 6 miles from Banner, and a mile and a half from the discovery made a short time ago by Messrs. Miller & Lester. The ore assays \$126 per ton in silver. The rock carries gold also, but to what extent is not known, as no assay has yet been made except for silver.

DOUGLASS COUNTY.—Silver City Avalanche, Aug. 27: There are some ledges in the vicinity of the Leonard mill, which have been looming up finely during the past few weeks. Among the prominent lodes there are the Whey Gulch, Rob Roy, Addie Leonard and others.

Subterranean Kaolinization—The Comstock Lode.

We find the following letter from Mr. John A. Church in *London Nature*, for August 5th. It will be read with interest by all who are interested in the scientific study of the Comstock lode:

A year ago Mr. John Arthur Phillips, in criticising, before the Geological Society, my theory of kaolinization as a source of superficial rock temperatures, made a point which is interesting in its bearing upon the composition of derived or secondary lithological products. He endeavored to ascertain this number of tons of felspathic rock that must be yearly kaolinized in order to supply the quantities of alkalies known to be contained in the mine waters of the Comstock silver lode in Nevada, and in doing so he began with the supposition that in the process of kaolinization all of the alkali in the feldspar goes into solution and is removed. This assumption is undoubtedly incorrect, for even the surface clays which are deposited from running water, and therefore must have been subjected to a maximum leaching, almost invariably contain potassic and sodic salts, as any one may learn by studying this subject of fire-clays.

But when the clay is formed by the alteration of rock at great depths, beyond the line of ready drainage and in the presence of a minimum quantity of water, the product is, or may be, quite different from the clay of sedimentary deposition. It is in fact merely the original rock hydrated, and from the example given in the Comstock region the alteration product does not seem to lose much, if any, of its original alkalies. This is demonstrated by the analyses given in Mr. King's report on the fortieth parallel. All the existing analyses of the clays in this region were made on specimens obtained in the first 1,000 ft. of depth, and most of them were taken within 500 ft. of the surface. That is, they all come from the region of active drainage, the oxidizing and other effects of atmospheric action being well marked in this lode down to the depth of 600 ft. The mean of four analyses of clays show 4.72 of alkalies and 10.86 of water, CO_2 2.05. One of the specimens has been very grossly altered, having lost about 10% of silica, while another seems to have gained about half as much of the same constituent. As to the composition of the original rocks (propylite and andesite) it is impossible to be exact, for the alteration in the region has been so extensive and thorough that all attempts to obtain an unaltered specimen have failed. The least altered specimen of propylite from the Virginia range of mountains in which this lode is found contains 5.08% of alkalies, with 1.02 loss by ignition. The most altered specimen contained 5.26% of alkalies, and 6.53 loss by ignition. Andesites showed in the least altered specimen 4.7 alkalies and 2.8 loss; in the most altered specimens 7.37 alkalies and 4.35 loss. It is impossible to compare the clays of this district with unaltered rock from other localities, for the reason that the composition of these eruptive rocks varies strongly, especially in the percentage of alkalies. On the whole I think that any one who will compare the tables of analyses given in Vols. I. and III. of Mr. King's work will be convinced of the truth of what I have asserted above—that subterranean kaolinization is merely the hydration of a rock in place without other serious alteration. The fact has importance in its relation to the origin of some hydrated aluminous rocks.

Mr. Phillips calculates that the average proportion of alkalies in these rocks is 6.4%; that 813 tons of alkalies are removed yearly in the mine waters, and that "it consequently follows" that the feldspar in 12,703 tons of rocks "must be annually kaolinized, and the whole of the alkalies removed in solution." It seems to me that a metallurgist of Mr. Phillips' experience should have known that the alkalies are never completely removed in kaolinization. That he is not acquainted with the peculiar and remarkable conditions of the Comstock is not surprising, for the lode receives but little attention, and that of the most hasty kind, from visitors. I ask your permission to add the following summary of facts which rebut Mr. Phillips' criticism:

1. The removal of alkalies in subterranean kaolinization, if it is judged by the existing incomplete series of analyses, seems to vary from less than one-fifth of the quantity of alkalies in the present rock down to almost nothing.

2. The whole results of kaolinization are not represented in the mine waters. In the vast areas of dry rock alteration has been extensive, and seems to be going on by means of water-vapor, and none of this action supplies alkalies to the mine waters.

3. The liberation of hot gas which is an accompaniment of kaolinization by atmospheric waters conveys the heat produced in the dry areas to all parts of the mass, and especially to such channels as watercourses and mine-openings.

4. Kaolinization in the Comstock region is not produced by the action of cold water on cold rock, but by the combination of water and rock, both already heated before the action to very nearly the temperature they attain after it. The heat of the rock is cumulative, its present temperature being mainly the result of ages of previous kaolinization, the heating effects of which were preserved from dissipation by a

blanket of rock 1,000 ft. thick. The water which takes part in the action at existing depths of the mine has been heated by its percolation through 1,000 to 1,500 ft. of hot rock lying below the blanket spoken of. Mr. Phillips calculates that 85° are added to the temperature, but in fact the actual increment of temperature by kaolinization is, in the locality given, but a small fraction of this quantity. Considering the small rainfall of Nevada, and the depths at which the waters are now drawn from the rocks, and the perfect correspondence of depth and temperature, it is more probable that the actual gain of heat does not exceed one or two degrees, and may even be less.

5. Mr. Phillips' calculation that 330 tons of water are heated by the kaolinization of one ton of rock has no foundation in the known facts, but it is probably more than 99% from this truth. His further error in supposing that the increment of heat is 85° F., instead of being in the neighborhood of 1°, as is more probable, relieves his criticism of whatever weight it might have if it had been adjusted to the well-known facts of the case.

The Gatling Gun.

This deadly and most useful weapon in certain circumstances of modern warfare has of late undergone several modifications in detail at the hands of the inventor, Dr. Gatling, who has recently had it on view at the offices of Sir William Armstrong & Co., in Great George street, Westminster. In the old-pattern gun, the cartridges were supplied from a large drum which was placed end upwards over the gun, the cartridges being delivered somewhat to the side of the weapon, and, therefore, out of line with its axis. The firing-handle was placed at the other side, and the barrels and working parts were more or less exposed. All this has now been altered, and the modified gun presents several new features. In the ten-barreled weapon, which we recently had the opportunity of examining, the barrels and the working parts are enclosed in a gun-metal casing 27 inches in length and 6½ inches mean outside diameter. Each barrel is 18 inches in length, the outside appearance of the gun being that of a howitzer. The crank-handle is now placed at the rear, instead of at the side, and by a re-arrangement of the firing mechanism the speed of the revolution of the gun and the rapidity of its fire has been greatly increased, so that it is claimed for it that it fires 1,000 rounds per minute, the ordinary rate of rapid firing being 750 rounds per minute. That it is well able to fire the larger number appears probable from this rapidity with which it was manipulated with dummy cartridges on the occasion of our inspection. The feeding is now effected from magazines or long cases, each capable of containing 40 cartridges. The case is placed vertically over the center of the lock-chamber of the gun, and the cartridges fall directly into the receivers. As soon as one case is emptied another takes its place, there being two attendants required, one for this work and the other to turn the handle. The barrels and locks revolve together, but in addition to this action the locks have a forward and backward motion. This is effected by means of a cam-path, up which each lock travels and pushes this cartridge home. It then fires it, and returns down this path, ejecting the cartridge-case from the side of the gun as it returns. This gun can be fired only when the barrels are in motion from left to right; and so long as the crank-handle is revolved and the gun fed with cartridges the several operations of loading, firing and extracting are carried on automatically, uniformly and continuously. Should the crank-handle be turned in a reverse direction no harm results to the gun, as the interior form of the receivers admits of reversing the motion without danger of jamming the cases. The traversing arrangement has also been simplified, and lateral play can be given to the storm of bullets that can be delivered uniformly with the firing of the piece. It will thus be seen that the gun has been greatly modified and improved, and reports from America show it to be capable of some very remarkable performances, both as regards rapidity and accuracy of fire. Dr. Gatling has made one of these guns for our own government, which will fire the Boxer cartridge, although he prefers the more solidly-made cartridges of the American pattern.—*Hardware.*

SOUND ADVICE TO YOUNG WIVES.—Some sound advice is given by a sensible matter-of-fact person to young wives, who are recommended not to worry as to how they can recover the lover, who has become merged in the husband. Ten to one he cannot be recovered. He is probably as dead as King Thotmes of the obelisk, and quite as probably never lived, save in the imagination of the woman he has married. The man beside the fire—not, of course, at this season—who drops asleep while his young wife is telling a funny incident about the last five o'clock tea, is very likely an excellent, respectable person, with no nonsense about him, who is worth ten such lovers as he was imagined to be.

THE ECONOMY claimed for the Perkin's high-pressure system, as developed in the little English steamer *Anthracite*, is to be verified by a careful experimental trial of her engines in New York. The owners of the steamer, having sufficient confidence in their claim, have placed her for that purpose in charge of competent United States naval officers.

A French Co-operative Scheme.

M. Godin, of Guise, France, turned over to a co-operative corporation one of the most extensive iron foundries in France, which he had built up, as all great businesses are built up, by enterprise, economy, honesty and intelligence. The company took his business at an appraised value of 4,600,000 francs, the payments to be 5% interest until Godin is bought out. It is managed by a board of directors, with Godin at the head, and in the division of the profits the workmen are entitled to a dividend on their wages, at the same rate as the dividend on the stock. For instance, the net profit last year, after paying interest and all other expenses, was some \$40,000. This profit was made on an outlay of \$300,000 in wages to labor, and \$40,000 interest to capital; accordingly, the stock receives less than one-seventh of the net profit, and the other six-sevenths is distributed among the workmen as the dividend of labor. All the workmen share in this dividend, and, as the result of years of teaching and preaching, many of them have invested their surplus wages in the stock, so that they are both capitalists and workmen.

In addition to this ownership of the establishment by the workmen, there are model lodging-houses, restaurants, baths and schools where the workmen can get all the comforts of life cheaper than the discomforts of life cost them outside. In spite of the attractions and advantages offered by this "social palace," as it is called, a majority of the workmen prefer the freedom of their own more expensive and ill-kept homes. Mr. Godin is reported as saying that his regrets having made his experiment with such dull and unpromising material as the workmen of Guise, who are, it must be admitted, deficient in point of intelligence; but in spite of these drawbacks something has been accomplished. Such a thing as a strike has never been known at Guise, the business has been uniformly prosperous, the workmen are better paid, better housed and in better condition every way than they would have been if Mr. Godin had been a mere capitalist intent on selfish enrichment; but the vital question is, is the arrangement permanent? The depressing answer is "No."

A single incident shows that the success of the experiment so far has been the result of a single will controlling the whole scheme, and that even among workmen trained by years of experience in the benefits of co-operation the selfish instinct of immediate individual gain overpowers their desire for a remoter gain through the general well being. Some time ago a rule was drawn up enacting that an allowance out of the general fund should be made to all workmen who fell ill and could not work. This allowance was to be paid from the day the illness began. Shortly after this had been decided upon the committee found the number of illnesses increased in a most suspicious manner, and the relief fund diminished rapidly. A new rule was made providing that no allowance for sickness was payable till the patient had been ill three days. This new arrangement had a miraculous effect upon the health of the *Familliere*, and the fund was soon as large as ever. Seeing this, the committee reverted to the original rule—of course with the same result as before. The relief fund dwindled away in a twinkling; and for the sake of the workmen's health—not to speak of their morality—it was judged advisable to abandon the instantaneous relief plan.

One such incident sets aside the whole experience of years in the attempt to establish human relations on any other basis than that of selfishness. When we speak of an enlightened selfishness as the basis of society, we may rest assured that the measure of enlightenment in the selfishness will be the measure of enlightenment in society, and there is no existing society in which the wage-earning class is sufficiently enlightened to carry on with success such a project as the kindly, generous heart of Godin has devised. There is no use in sentimental regrets over the failure of experiments carried on under conditions which render success impossible, and the failure of the Guise *Familliere* will merely prove that Godin was too early with his reform. If we were to seek a law or formula by which to describe the inevitable failure of such experiments, we might say that in a condition of society in which they are practicable they will not be needed; or, we might say that workmen intelligent enough to profit by them will be, and are, intelligent enough to get along quite as well without them.

DEFECTIVE PATENT LAWS.—The British patent laws certainly demand both revision and amendment when so cautious a man as Mr. Crooks, who has made not only notable advances in science and the arts himself, but has been the ready and honest exponent of what has been accomplished in both by others, is compelled thus to express himself: "We know of a certainty that there are men in England who refuse to tell their ideas to the public, because they will obtain nothing in return, except some reply such as that they are not the true inventors, and proof is expensive."

EDINBURGH'S educational department are of the opinion that it is of the utmost importance that reading should not be taught out of one set of books. Two or three sets ought to be used in every school in order to prevent the habit of learning by rote through constant repetition, and to accustom the children to read any book at sight.

Measuring the Velocity of Light.

Prof. Simon Newcomb has finished an apparatus of great scientific interest and value for measuring the velocity of light. Though the principles of its construction are not new, the details are such as to insure increased accuracy. Its most conspicuous parts are two brass tubes, eight ft. in length by about two inches in diameter, placed horizontally at right angles to each other, like the two branches of the letter L, and resting at the angle and at the outer ends upon low, solid columns of brick and stone. These tubes are telescopes, differing from ordinary instruments only in respect of their great length and small diameter. One of them is immovably fixed upon its bed of masonry, while the other—being laid in a plane about two inches lower with its "object" end upon a pivot—swings by means of a delicate screw to the right or left through a radius of 1° or 2°.

At the angle formed by the line of the two telescopes, and placed so as to be in the line of vision of both, stands a small mirror of peculiar construction. It is a square column of steel, five inches in length by two in diameter, and pleted upon its four sides with nickel. It is mounted, top and bottom, upon pivots, so as to revolve horizontally, its motion being given to it by a rawhide cog-wheel. Affixed to one of the wheels which give motion to the mirror is a device for breaking an electric current, connected with a recording clock, so that the number of revolutions of the mirror each second is automatically recorded. The power to give the mirror its revolutions is furnished by a steam engine built for the purpose, and placed in an adjoining building.

A few ft. distant from the eye glass of the fixed telescope, and in a direct line with the instrument, is placed a helioscope—an apparatus consisting of a mirror mounted upon complicated bearings and moved by clock work, so that when wound up and adjusted it will follow the apparent motion of the sun, reflecting its rays for any desired length of time upon a given point. The rays of sunlight thrown from this instrument are brought to a focus by an intermediate lens upon the eye glass of the fixed telescope, through which they pass to the surface of the revolving mirror at the other end.

At the Naval Observatory at Washington, some 8,000 ft. distant from Fort Whipple, across the Potomac (its exact distance will be ascertained by the coast survey before actual work is begun), is placed a fixed mirror, circular in form, three ft. in diameter, and of such a delicate degree of concavity that light thrown upon it from the revolving mirror at the fort is returned again and brought to a focus as near as may be upon its starting point. In other words, this mirror is a section of the inner surface of a shell which, if complete, would be three miles or more in diameter. Of course, to all appearance, it is perfectly flat.

Now, to understand the working of the apparatus, let it first be supposed that the revolving mirror is at rest. The course of the sun's rays will be as follows: Striking the mirror of the helioscope, they will be reflected through the intermediate lens upon the eye glass of the fixed telescope, through the instrument to one side of the revolving mirror, thence to the concave mirror across the Potomac, by which they are returned to the revolving mirror, and are finally reflected through the movable telescope to the eye of the observer placed at the eye glass. This point at which the telescopes rest to receive the sun's rays after they have made their tortuous journey, the revolving mirror being at rest, is marked zero. Now apply the same and set the revolving mirror in motion. Give it 200 revolutions a second, and its four sides will throw 800 reflections of the sun's rays across the Potomac to the mirror at the observatory. The observer no longer catches the sun's reflected rays through the movable telescope at zero, but swings his instrument to the right or left, according to the direction in which the mirror is made to revolve, until they again reach his eye. Reflections, following each other with such enormous rapidity, appear as a single reflection.

This, then, is the whole process. It remains only to note the number of revolutions per second, as indicated by the recording clock, and the degree of deflection from its normal position at zero given to the movable telescope, and work out the result as a "sum" in arithmetic. It will be seen that, while a ray of sunlight is making its journey across the Potomac and back, between the revolving mirror and the fixed concave mirror, the former will have made some portion of one of its revolutions. This portion is represented by the degree of deflection which it is necessary to give to the movable telescope to catch the rays upon their return and second reflection from the revolving mirror.

The following propositions, penciled by Prof. Newcomb, illustrate more accurately the results to be attained from given hypotheses: Speed of mirror, 200 turns per second; deviation of reflecting ray, 2½°; distance, 1.6 miles. Results: Motion of mirror in one second, 360° × 200 = 72,000°; observed motion of mirror while light is going and coming, 1½° is 72,000 ÷ 1½ = 57,600. Then velocity of light = 2 × 1.6 × 57,600 = 184,320 miles per second.—*Iron Age.*

THE Portneuf Falls, southern Idaho, are described as grand in the extreme. For several miles there is a succession of cascades, falls and deep pools full of trout.

THE ENGINEER.

The Belgian Cable System on the Erie Canal.

Great expectations are entertained in regard to the success of the introduction of the Belgian cable system upon the Erie canal. A company has been formed to carry out the project, which will at first operate over a given section. A wire rope is now being laid for a distance of 250 miles, and 18 cable tow-boats have been built with which to operate. Towing has already commenced on the first section of 60 miles, between Syracuse and Utica, and boats will soon be taken by cable over the whole length of the wire.

The *modus operandi* is as follows: The wire rope is laid on the bottom of the canal and fastened at the two ends. Now, suppose a man in a small boat wishes to come to Utica, and draw four, six or eight small boats behind him. He simply sits in his boat and pulls on the cable in an opposite direction from Utica; the operation would naturally force the boat east, and its continuance would eventually bring the first boat and the boats connected with it into Utica. The occupants of the boats attached in the rear, not taking hold of the cable, must do their share of work by steering so as to keep the line from swinging, like a whip-lash, from one side of the canal to the other.

When a tow or tug-boat is employed, the tug takes the place of the small boat, its "clip wheel," which grasps the cable and pulls, represents his fingers, hands and arms, the powerful engine and boiler supply the muscle, and the string of six or eight canal boats connected in line by hawsers represent the small boats behind the first skiff.

The company charges 20 cents a mile per boat for towage, which is the same as has heretofore been charged for horse towage; but while cable towing costs the same as animal power, it increases the profits by doubling speed. The cost is uniform during the season. The system is to be applied to all the canal boats, say 3,000, now in commission on the Erie canal. Animal power cannot compete with the cable system. Any increase of charges by the company would cause a return to the use of animals. Except it is greatly to the profit of the boatman, he will not patronize the company. The company cannot become a monopoly, as its chartered rights do not interfere with the free use of the canal.

The cable is seven-eighths of an inch in diameter, made of Bessemer steel wire, in six strands of seven wires each. Thirty miles cost \$18,000 and that quantity weighed 80 tons.

New Developments in the Mississippi River Improvements.

Several new features of an important and interesting character, and quite independent of the deepening of the channel, have quite recently been developed, as growing out of the improvements in progress at the mouth of the Mississippi. That which most deeply interests the general public is the light that is being thrown upon the problem of controlling the tremendous forces of the Mississippi river, so as to secure constant and practical navigation from St. Louis to the mouth, to maintain an approximate uniformity of channel and velocity of current, to regulate the caving of the banks, and to modify the annual disasters from floods. These are questions in which the people of the vast Mississippi valley are directly and individually interested, and in which the prosperity of the entire nation is largely involved. The successful solution of this problem will contribute to the enrichment of 14 great and growing States. It will reclaim to civilization millions of acres of lands of unexampled fertility, populate a vast empire now practically uninhabitable, and more than double the productive capacity of the valley.

The most interesting and important fact revealed by the present inquiry is the singular effect upon the river bed produced by the spring floods. Investigation shows, beyond all doubt, that, during these floods, the river bed is raised throughout the whole extent of the stream, and, in many cases, to a point considerably above the low-water mark of the summer. As soon as the river channel fills, and the water begins to spread out over the lowlands, the velocity of the current is checked, and the enormous masses of earthy matter previously held in suspension are deposited. This process continues so long as the river remains up, and it goes on with such rapidity that the bed is gradually raised and the water thus lifted out and over the banks. By these means the volume and duration of the annual overflows are incalculably augmented, and thus it appears that the execution of the plans to prevent the spreading of the river and formation of bars will exert a direct and powerful influence for good upon the destiny of our alluvial lands. It seems, then, that the jetty principle, which has given New Orleans the finest deep-water harbor and outlet in the world, will also give to the Mississippi river a permanent and reliable navigation throughout its length, and to the alluvial region of the valley a great and sorely-needed relief from the calamities which now impoverish and depopulate that fertile territory.—*New Orleans paper.*

USEFUL INFORMATION.

The Flavor of Meat.

M. Moular, a noted agriculturist in France, has suggested a singular plan for varying the flavor of meat. He imagines that by feeding cattle, sheep, pigs and poultry in a particular way, or rather by flavoring their food in various ways, their flesh may be rendered much more agreeable to the palate than it often is; and there can be no doubt that he is substantially right. Thus, for instance, it is well known that poultry which have been fattened upon food containing a slight admixture of chopped truffles are far better eating than those chickens which have been stuffed or larded with truffles after they are killed. It is only natural that such should be the case, for the flavor of the truffle that is consumed by the chicken permeates the whole system, which it cannot do when simply placed in the carcass. M. Moular instances cases in which bares killed in a wormwood field, larks shot in a cabbage field, and eggs laid by hens which had eaten diseased silkworms, had such a nauseous taste that no one could touch them; while upon the other hand some ducks and hildfares which had fed upon sprigs of juniper had a delicious flavor. He has made several experiments—among others, three upon tame rabbits, which he fed with the waste of aniseed, with harley and bran containing a slight flavoring of juniper, and with harley and bran containing a little essence of thyme. In each case he found that the flesh of these animals was far better eating than that of rabbits fattened in the ordinary way, and yet that there was no trace of aniseed or juniper in the taste. His conclusion is that cattle, sheep and pigs might be fed in the same way, and that by varying the flavoring matter the beef, mutton and pork might be made to have several different tastes.—*Caterer.*

THE WONDERFUL ADAPTABILITY OF PAPER.—The adaptability of paper to numerous important and widely varied uses is wonderful. What other substance can be so satisfactorily substituted for wood, iron, and such common materials, to the extent that paper can be? It is impossible to find anything else which, like paper, may be so differently and dexterously prepared, as regards flexibility, thinness, strength, durability, imperviousness to fire and water, etc., that it can be readily made into pails, washbowls, dishes, bricks, napkins, blankets, barrels, houses, stoves, wearing-apparel, curtains, bonnets, newspaper and writing sheets, wrappers, carpets, coating for iron ships, flower-pots, boxes, parchment slates, coverings for the leads of pencils, jewelry, lanterns, car-wheels, dies for stamping uppers of shoes, roofing, and many other things. It is this tendency on the part of paper to take the place of everything else, to become a universal substitute, so to speak, which leads to the conclusion that the future has a grand development in store for it, and that in years to come its manufacture will hold a magnificent position among the great industrial interests of the world.—*Chicago Journal of Commerce.*

IMPROVED LAMPS.—Mr. Sugg, the well-known gas engineer, has lately devised a form of compound Argand burner for street and out-door uses. It is now in use in London on several of the prominent thoroughfares, and is highly commended. Several of these gas lamps give an illumination of 200 candle-power each. The same inventor has likewise devised a very ingenious self-ventilating gas lamp for the special use of libraries. It is provided with a chimney in the form of a metallic tube, which delivers the products of combustion out at the roof, or to some other convenient place outside of the library room. This flue is surrounded by a second larger cylinder communicating with the base of the lamp, which is closed, and through which the lamp receives its air supply also from the outside of the room. The lamp, therefore, neither impoverishes nor vitiates the air of the room. It was designed to meet the objection that the sulphurous gases evolved in the combustion of coal gas have a deleterious action on the leather of the book bindings.

IMMENSE DEPOSIT OF SODIUM SULPHATE.—The *American Journal of Pharmacy* notices the occurrence, in the Russian Caucasus, of two lakes which contain immense quantities of sodium sulphate, from which this salt is obtained in an almost pure state. The lakes have no exit, fill up in the wet season, and in summer their contents partially evaporate. The salt is obtained in layers of from a quarter to four inches thick, as it separates in consequence of cold or by evaporation in summer. Samples that were analyzed show that the dry salt contains 95% pure sulphate, of which it has been estimated the two lakes should yield 260,000 tons. It is further said that a French company has been formed to work this deposit systematically. Of the origin of the salt our informant gives no explanation.

TO CUT SHEET BRASS.—Moderately thick plate may be cut chemically by drawing a line or mark with a solution of mercury in nitric acid. The acid attacks the copper, while mercury amalgamates with the zinc; this seems to be the explanation; at any rate, the brass becomes as brittle as glass on the place where the line is drawn, and is easily broken off.

RED OAK AS AN ORNAMENTAL WOOD.—Red oak is found in abundance in almost all parts of the country, and from its plentifulness and its unsuitableness for a large majority of the commercial uses to which white oak is utilized, has been looked upon with a contempt, but little deserved when its adaptability to the manufacture of furniture is taken into consideration. It is more brittle than white oak and more porous, and this has probably been the cause of its neglect for shipbuilding purposes, combined with the fact that it is more susceptible to the attacks of the insect world which abound in salt water. It is not a wood which will stand the variations of wet and dry; and while white oak was to be had in abundance, the red oak was thought fit only to be made into flour barrels. When sawed bastard, so as to fully develop the grain, there is no question of its beauty being equal to black walnut, in the eyes of those who are not prejudiced in favor of the rich dark color of the latter.

INTERESTING IF TRUE.—Last week, says a late exchange, a man named Glyden, who was employed at the stove factory at Empire City, Oregon, came in contact with a buzz-saw, and one of his arms was cut entirely off just above the wrist. The unfortunate man had presence of mind enough to replace the severed member, but in his haste turned it so that the palm of the hand faced outwardly. This mistake was noticed at once by a fellow workman, and the arm was placed in its proper position, bandaged, and a physician being fortunately obtained, the flow of blood was stopped, and there is now a fair prospect that in a few months' time his hand will be as good as ever. Certainly a most wonderful escape.

HOW TO USE OIL-STONES.—Instead of oil, which thickens and makes the stones dirty, a mixture of glycerine and alcohol is used by many. The proportions of the mixture vary according to the instrument operated upon. An article with a large surface, a razor, for instance, sharpens best with a limpid liquid, as three parts of glycerine to one part of alcohol. For a graving tool, the cutting surface of which is very small, as is also the pressure exercised on the stone in sharpening, it is necessary to employ glycerine almost pure with but two or three drops of alcohol.

GOOD HEALTH.

Effect of Starvation on the Blood.

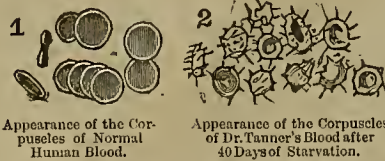
During the last hour of Dr. Tanner's 40 days' fast, some of his blood was withdrawn from the hand and subjected to a careful microscopic examination by Dr. P. H. Vander Weyde. It was found to be entirely different from healthy blood. The corpuscles, which are otherwise smooth and round flat disks, with a depression in the center, and of an average diameter of 1-3600th part of an inch, were found to be ragged, irregular and shrunk to the average of about 1-5000th part of an inch in diameter.

When blood is given time to dry on the microscope slide, the corpuscles may lose their smooth appearance and become smaller by shrinkage, but in this case there was no chance to be misled into error by such a cause, as the blood was examined while perfectly fresh and the corpuscles still moving freely in the plasma.

This ragged appearance was so common in all of them that there was scarcely a smooth corpuscle among them, except the white ones, which had very nearly the normal size and were smooth. Their number, which ordinarily hears to the red corpuscles the proportion of 1 in 400, was apparently increased. Occasionally the white corpuscles were seen clotted together in a way never observed in normal blood.

A further study of these abnormal red corpuscles showed that their rough appearance was generally caused by points projecting from their surface, and looking like a fungoid growth which covered them, while in many this growth appeared to be taking place at the expense of the corpuscle itself and living on its substance, as the corpuscles most densely covered were the smallest and the most irregular in shape; in fact some of them appeared disintegrating and breaking up.

We represent here some of the corpuscles as they appeared in the blood of Dr. Tanner, as seen and drawn by Dr. Vander Weyde, and at the side of the healthy blood the contrast is striking:



It is a common law observed in organic substances that when a breaking up of the structure is impending, foreign living organisms spring up, and are sustained at the expense of the decaying organic body. Mold, and all kinds of fungoid growth, originate according to this law, while in infusorial life it reaches its highest development. In the latter case it appears intended to economize the organic materials of the structure, and in place of allowing them to decompose into their primary elements, and to be built up again by the slow and laborious process of vegetation under the influence of light, these organic materials are directly transformed into food for the larger inhabitants of water, and finally for fishes.

rious process of vegetation under the influence of light, these organic materials are directly transformed into food for the larger inhabitants of water, and finally for fishes.

If the formation of fungoid spores, which is of a vegetable nature, also serves a useful purpose (which is probable), is as yet a question to be determined by further investigation; but certain it is that such a growth is not confined to large masses, but even found on the surface of such small objects as the corpuscles of the blood; this in fact has been recently investigated by microscopists, especially Koresl, and such growth was found upon the blood corpuscles of patients when seriously suffering from various malarial diseases, such as typhus fever, etc., also in the last stages of consumption; and they agree that this growth exerts a destructive influence upon the body in which it takes root.

The appearance of Dr. Tanner's blood verifies this opinion. Very few, if any, corpuscles were free from the fungus, and all appeared to have suffered and shrunk in size, while many of them had become irregular in shape, and evidently were breaking up. As it appears to be the function of the liver to secrete the effete blood corpuscles, the liver of Dr. Tanner must have been taxed greatly, and this would explain his hitherto suffering during the latter stages of the fast, when he often vomited bile with the mucus of his stomach.

In regard to the latter its digestive powers are phenomenal. Immediately after breaking the fast at the exact hour that the 40 days were ended, by eating a peach, he drank successively two large glasses of milk, ate half a watermelon, two beefsteaks, five apples, drank Hungarian wine, and had a good time generally, and was the next day already in good condition, gaining at the rate of five pounds weight every 24 hours.

The effect on the blood was very perceptible only 24 hours after breaking the fast. The fungoid spores had disappeared from a great many of the blood corpuscles, or, rather, perhaps, fresh ones had been evolved in the system, which is the most probable, as they looked as smooth and fresh as if they were entirely new. At the second day about half of the blood had become normal, while on the third day most all the corpuscles were restored; however, there were here and there still some imperfect ones, irregular in shape, as if they were remnants, and even some of these were not yet entirely free from the fungoid growth.

Powers of endurance have been exhibited by various individuals, but we believe none have ever gone through such severe and well authenticated test of physical endurance as Dr. Tanner, to whom at least the credit should be given to have practically demonstrated what man can endure when he, to use Dr. Tanner's own words, "once understands his own machinery and knows how to run it."—*Scientific American.*

Pertinent Facts About Eating.

In a recent number of the *London Standard* under the query, "do we eat too much?" the writer gives many interesting facts. He says, for instance that the amount of nourishment which a person needs greatly depends on his constitution, state of health, habits and work. A sedentary man requires less than one whose duties demand the exercise of his muscles, and a brain-worker needs more than an idler. But unquestionably the majority of us take more than we need. Indeed, food and work are distributed most unequally. The man of leisure is also the man of means, and accordingly, fares sumptuously every day; while the laborer toils for eight hours, and finds it difficult to get enough to repair the waste of his tissues. Yet a Chinaman or a Bengalee will toil under a tropical sun, and find a few pice worth of rice or jowrah sufficient to sustain his strength. A Frenchman will not eat half what an Englishman engaged in the same work will demand, and a Spanish laborer, content in ordinary times with a watermelon and a bit of black bread, will toil in the vineyards and grow fat on a dietary of onion porridge and grapes. It is true that Mr. Braesey, when building the Continental railway, found that one English navy was worth a couple of spare-fed foreigners. But, on the other hand, the British Columbian and Californian gold-diggers, than whom a more magnificent set of athletes does not exist, live in the remote mountains of the Far West mainly on beans flavored with a few cubes of pork. But they also obtain the beet of water and the purest of air, and their out-door life and active exercise enable them to digest every ounce of their frugal fare. The English soldiers, though better fed than those of any army except the American, do not get one-half the amount of solid nutriment which the fittest of club-loungers considers indispensable for his sustenance. An athlete in training is allowed even less food; yet he prospers on the limited fare, and prolongs his life by the regimen by which he has been subjected. King Victor Emmanuel was a monarch of the most robust physique; yet he only ate one meal per day, and it is manifestly absurd for any man to require three more or less weighty meals, and an afternoon cup of tea, to support the exertion of walking to the club, riding an hour in the park, writing a note or two, and dancing a couple of miles around a ball-room. The ancients had their "amethusetois," or "sober stones," by which they regulated their indulgence at table. The moderns have not even this. But they have their gout and their liver to warn them, when it is too late, that nature has been overtaken.

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SAN FRANCISCO:
Saturday Morning, Sept. 11, 1880.

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The Week.

The most interesting event of the week has been the arrival in this city of the President of the United States. The incident is sufficiently novel and gratifying to awaken the liveliest enthusiasm of our people; for it is the first time in the history of the State that the Chief Magistrate of the Union has visited the far-off shore of California. President Hayes has been welcomed with a genuine warmth of feeling; for apart from his exalted official station, which is not surpassed by that of King or Kaiser, his fellow citizens recognize in him the upright and estimable American gentleman. His journey hither has been marked by the most cordial respect from the entire body of the people. While reflecting upon these things one cannot help thinking of a recent journey through his dominions of a foreign potentate, surrounded by thousands of armed men, and other thousands of the emissaries of a sleepless police, to shield his majesty against hundreds of eager assassins among his own subjects.

Since our last issue the Freeholders' Charter for this city has been submitted to a vote of the people at a special election, and was rejected by an overwhelming majority. The vote was very light, amounting to only 23,352, of which number 19,270 were against the charter, and 4,145 for it. It is a most decisive vote.

The news from the mining counties of this State is very satisfactory. Many of the hydraulic claims have cleaned up for the season, and are now busy with preparations for the next rainfall. The yield of gold has been fully up to the average season. For a detailed account of mining operations in every State and Territory on the coast, we refer the reader to our comprehensive "Mining Summary."

A PROMISING MINE.—The Salt Lake Tribune, of the 5th inst., says the December G. & S. M. Co. of Lincoln district, Beaver county, has just made its first shipment of ore, amounting to about 10 tons, from the December mine. The ore sampled as follows: First class, 47% lead, \$166.11 in silver; second class, 39% lead, \$117.64 (91.2 ounces) silver and \$6 in gold; third class, 12.5% lead, 56.37 (43.7 ounces) in silver and \$6 in gold. The whole shipment thus averaged about \$100 in gold and silver, and 33% lead.

The Tendency to Cities.

The census which has just been taken shows an increasing tendency of the population towards cities. We have become, as an Eastern writer has remarked, "a nation of cities." Our people apparently have long since disregarded the monition that "God made the country and man made the town." Whatever may be the cause, we are building up cities more numerous and rapidly than any other people ever did. The cause of this tendency does not lie upon the surface, and is more or less complex; but we think it may be explained in part by the operation of the "law of mutual help"—the instinct which impels men to desire a closer association and co-operation for their mutual comfort and advantage. As men advance in civilization they become more gregarious; and the advantages and fascinations of city life are many and great. But there must be some necessity which impels men to move toward common centers.

The late census was not needed to show that the drift of population in this country was towards cities. From 1860 to 1870 the urban population increased faster than the rural in all the settled states of the North. Several of the Eastern papers have given exhibits of the tendency of our population, as shown by the census returns, since 1860; but the best that we have seen is in the Springfield *Republican*, and as that journal is unusually careful and trustworthy we will use its figures. They show that the city population of the United States is not only increasing faster than its agricultural population, but that it has reached a point at which its relative share of the population of the country is equalled in Europe only by Great Britain, while the number of its cities is equalled by no other country. The list of cities, though incomplete, shows an aggregate urban population of 8,203,238. The same cities in 1870 had a population of 5,039,490, showing an increase in 10 years of 3,163,748, or 62%. During the same interval the population of the country has advanced less than one-half as fast, or at the rate of 25%. There is no doubt that the complete returns of all the cities of the country will give them a population of over 9,000,000. Of this large total, between 7,000,000 and 8,000,000 are to be found in cities containing upwards of 50,000 inhabitants. At the lowest estimate, from one-fifth to one-sixth of the population of the country is now living in its cities, and this in a population of about 48,000,000, whose farmers in the West supply the world largely with food, while those in the South supply it with cotton.

In Massachusetts, New York, Illinois and Ohio, there has been a large increase in the urban as compared with the rural population. In Illinois and Ohio the chief increase is due to their cities, as in both states there are counties which show a decrease of population. The cities of the South show a comparatively light increase; and on the Pacific coast the increase in city and country has been about equal, although many of the cities, notably San Francisco and Oakland in this State, show a large increase in their population. In the great and prosperous States which lie between the Atlantic and the Mississippi, north of the Potomac and the Ohio, the increase of population is due chiefly to the growth of great cities. It has been estimated that within the area designated five-sixths of the urban population of the country will be found. It is apparent that the tendency of our population is towards cities. In a table published by the *Republican* there is a list of 106 cities in which the population ranges above 30,000 and above 1,000,000. Of the number, 1 has a population above 1,000,000, 1 above 750,000, 2 above 500,000, 5 above 300,000, 1 above 250,000, 2 above 200,000, 3 above 150,000, 7 above 100,000, 4 above 75,000, 11 above 50,000, and 69 above 30,000.

The *Republican* mistakes greatly, we believe, when it says that the experience of Cincinnati, St. Louis, New Orleans and San Francisco "indicate, without absolutely proving, that at many centers American cities have reached substantially their full growth." On the contrary, we believe that all the facts presented by the relations of the four cities mentioned indicate that they have not nearly reached their full growth. Certainly, so far as San Francisco is concerned, the facts of the late census do not warrant the conclusion. For, after several years of extraordinary depression, during which the population was thinned by thousands, she shows an increase in 10 years which is surpassed by few cities in the country. The city is recovering her prosperity slowly but surely, and it appears entirely safe to predict that its population will largely increase—we believe it will double itself—before the expiration of the present decade.

A MINE SUIT SETTLED.—The vexatious and long-pending difference between the Justice Mining Company and Schultz & Von Bargen has at last reached a satisfactory settlement. On Tuesday all the pending actions between the parties were dismissed in Judge Evans' court. The business has been well settled, to the advantage, we believe, of the shareholders of the Justice, for the continued litigation was good for neither mine nor shares.

"The Microscopist."

We have before us the fourth edition of "The Microscopist," which, it is but truthful to say, is one of the most complete and comprehensive works on microscopy extant. The publishers, Messrs. Lindsay & Blakiston, of Philadelphia, have spared no pains in giving the work a neat typographical appearance, and no expense in embellishing it with a profusion of well-executed and most faithful illustrations in each of the several branches of study to which it is devoted. This edition has been enlarged by the addition of over 200 pages of entirely new matter, devoted to Pathology, Diagnosis, and Etiology, illustrated with wood-cuts from Rindfleisch. A full index and glossary have also been combined in this edition, which, together with notices of recent additions and improvements to the microscope, will be found a source of much valuable information to the microscopist.

The work, as it now appears, is a perfect manual of microscopy and a full compendium of microscopic science in all of its leading branches of mineralogy, chemistry, biology, histology and medicine. No physician, at the present day, can be considered well up or can keep up with his profession, without practical knowledge of the microscope and microscopic science. To the student of physical phenomena, a knowledge of the minute structures of the universe is quite as essential as the study of those grander aspects of nature which are shown forth in the heavens or spread out upon the surface of our earthly sphere. In the arts also, as well as in scientific investigations, the microscope now finds a most needful and conspicuous place. The jeweler, the engraver, the miner, the man of commerce and, in particular, the agriculturist and horticulturist must make more or less use, and have more or less knowledge of the microscope, either as a simple or compound instrument.

It is to Dr. J. H. Wythe, of Oakland, that the public is indebted for this most valuable work, and we trust it may be the means of adding largely to the grand army of true and earnest workers already engaged in the various fields of microscopic research. We speak from personal knowledge when we say that the Doctor is a modest and unpretending, yet a rare and most enthusiastic worker in this interesting field of science; and that he works for the love of it and for the good that may grow out of it, rather than from any hope of pecuniary reward. "The Microscopist" is for sale at the bookstores generally, price \$5, neatly bound in cloth.

FAST HYDRAULIC SCHEME.—We learn that a remarkably bold mining project is in contemplation by a party of California hydraulic miners. It is no less than to dig a tunnel on Feather river, commencing at Whiskey Bar, on the northern end of the Big Bend, at a point about three miles from Yankee Hill to Island Bar, on the southern end of the Big Bend. This tunnel is to run under the Big Bend mountains about two and a half miles, and is to be capacious enough to turn the water of Feather river so that the entire bed of the river between those points can be worked. The *Chico Enterprise* says a company with ample means has been formed to carry out the bold scheme; and that a surveyor is now engaged in making a survey of the route of the proposed canal. The length of ground that can be worked, if the river is successfully turned, is over 12 miles, and no part of the mining region in this county has given better prospects than the whole of Big Bend. For many a long year the Feather river has flowed through this ancient channel, which is nothing less than a natural sluice, and the quantity of gold that lies embedded in its hidden recesses must be incalculable. The project is a bold one, yet seems feasible. There are no difficulties apparent in the way of running the tunnel, and when once completed, so that the water is carried through the short cut of two and a half miles, the work of washing the enormous mass of pay dirt will be simplicity itself.

A THRIVING MINING CAMP.—Rich discoveries continue to be made in El Dorado canyon, San Bernardino county. A correspondent of a San Bernardino paper, writing from that camp, says: We have visitors who desire to hound our mines, but as long as we are taking out rich ore and plenty more in sight, we want to see the cash if we dispose of our claims. We struck an 18-inch ledge of ore that assays \$416 per ton. A contract has been let on the Silver Eagle to run a tunnel 50 ft. Work has been commenced on the January mine. The ledge is from 6 to 40 ft. wide. The ore so far taken out assays from \$100 to \$300 per ton. Men are arriving here every day, and I believe there will be a camp of 500 men here in less than two months. Mr. Philie, the Raymond & Ely Superintendent, has returned from California. He has bonded a mine for \$10,000 and will commence work on it immediately. Weaver is still sinking on the Lone Star mine, and taking out ore that mills about \$1,000. The streak is only eight inches wide. Nichols, Howell and Warneke are at work on their claim, and are taking out horn silver ore that so far has assayed \$5,860 per ton.

Aaron Process.

EDITORS PRESS:—It has recently been found that the quartzite ores of the Diana mine, near Beaton, in Mono county, can be worked very satisfactorily in iron pans without roasting, a result which I freely confess somewhat surprises me, as Mr. Millet, of the Comanche mill, tried it only a few years ago without much success. I attribute the improvement to the relatively new practice of working the pans without grinding the ore in it, as I am pretty sure it could not be done in the old way.

It is well known that, 11 years ago, I introduced at Benton a process of working those ores in a barrel, to which process I had the temerity to attach my name, not because it was essentially new, but as explained in all my writings and conversations about it, particularly in my little book on "Testing and Working Silver Ores," because of certain modifications and improvements which I made, and because I introduced successfully a process, which, in its original barbarous form, would never have been used in this country.

The process continued to be used at Benton till quite recently, but now that it is superseded by an improved system of pan work, I receive the enclosed flattering notice from the *Weekly Bentonian*, which at least shows that the editor of that paper has not been a diligent reader of the MINING AND SCIENTIFIC PRESS, or he would hardly accuse me of affecting secrecy or mystery about my work.

C. H. AARON.
Editor *Bentonian*.—DEAR SIR: Was not the "barrel process" used in the Diana mill, of which you wrote some what disparagingly in the last *Bentonian*, a recent discovery and was not the inventor Charles H. Aaron, who at one time had charge of some of the mills around this camp, the Diana included? and is it not known as "Aaron's Process?"—INQUIRER, Benton, August 26, 1880.

No, sir. The barrel process of amalgamating ores was discovered, perfected, and put in use by Father Cascastades, a Spanish priest, in one of the Mexican States, in the year 1721. If you can borrow a slate and a short pencil, and if you are anyways apt at figures, you can ascertain, in the course of an afternoon's mental calculations, that this was probably some years prior to the birth of Charles H. Aaron, and that it was even before the discovery of mines on Blind Spring hill. This was the first known process of amalgamating ores ever discovered, so far as the encyclopedias furnish any information. "Aaron's process" consisted in being so mysterious with his chemicals and his barrel as to impress his employers with the belief that he was in possession of some valuable secret in connection with amalgamation, thus always securing to Charles H. Aaron a good fat situation. So far as we can ascertain Mr. Aaron is entitled to no credit in regard to the workings of the barrel process.

Fairs and Horses.

Now that the State fair is about to open, with its exhibits and displays of the industry and products of field and farm, garden and orchard, etable and barn, it is well perhaps to say a word about the chief business, or rather the chief events, of such gatherings. That is, pure and simple—horse. And if it shall be the trotting horse, we say amen to the mauly pastime. One cannot easily forget the clear-headed wisdom of the ever-delightful Autocrat of the Breakfast Table: "Wherever the trotting horse goes, he carries in his train brisk omnibuses, lively bakere's carts—and therefore hot rolls—the jolly butcher's wagon, the cheerful gig, the wholesome afternoon drive with wife and child—all the forms of moral excellence except truth, which does not agree with any kind of horseflesh." This is a sad judgment on trotters, for even that noble animal has been taught by the yahoos of the stable that "evil communications corrupt good manners." Yet, in the main, the just Autocrat is sound on the trotter. Hear him: "Horse racing is not a republican institution; horse trotting is. Now just compare the racer with the trotter for a moment: The racer is incidentally useful, but essentially something to bet upon. The trotter is essentially and daily useful, and only incidentally a tool for sporting men." Here is a fine distinction and a radical difference; and it is not the fault of the trotting horse if it is not as true now as when it was spoken. The trotting horse is essentially a republican institution. The masses want trotters, and are best served by them. Therefore, gentlemen of the State fair, give us horse and plenty; but by all means let it be the trotting horse.

A COLLIERY HORROR.—Dispatches from London say that a terrible explosion occurred on the evening of September 8th in the Seaham colliery, in Durham county, on the North sea. At the time of the explosion, it is estimated that from 180 to 250 men were in the pit. The latest news is that a total of 66 men had been rescued in an exhausted condition. So far there is no sign of fire, but it is evident there is a large accumulation of gas. Two corpses have been brought to the surface, one of which was badly burned. The greatest excitement prevails in the neighborhood of the colliery, and the frantic cries of the wives and children of the imprisoned men are represented as terrible.

Notes on Some Sierra County Mines.

[The gravel claims of Brandy City, Scales' Diggings, Port Wine, St. Louis, Howland Flat and Gibsonville. Compiled from the Sierra Free Press.]

Brandy City.

This town is surrounded on all sides by large canyons, and receives its supplies on mules and Chinamen. It has a population of 150, besides a large number of Chinese. The mining season just closed has been the shortest one for years, and is due to the fact that a snowslide carried away some 1,500 boxes of the Hoosier ditch, from which the mining companies get their water.

The Brandy City hydraulic mine is represented to be one of the richest in the county. It was located about 26 years ago, and since that time has yielded millions to its owners. The company has ground enough to last it for many years to come. The water gave out about three weeks ago, and the company has just finished cleaning up. About 15 men are now employed running powder drifts and extending the main flume, and getting ready for the coming season.

The Arnott claim, about a quarter of a mile east of the town, has closed work for want of water, and the owners are now cleaning up. During the season a large ore of ground has been washed, and the yield, so far as known, has been satisfactory. The claim employs a number of men the year round.

The Grizzly claim, about a mile south of town, has closed down and cleaned up. This claim has always paid well, and as the last run has been a long one, it is presumed the result has been good.

The Bunker Hill Co. is about four miles north of Brandy City, and is a drift gravel claim. The company is running a bedrock tunnel, with flattering prospects. The owners, a body of hard-working miners, have already expended a considerable sum of money on their ground.

Scales' Diggings.

This camp lies about seven miles northwest of Brandy City, and is reached by one of the roughest, steepest, crookedest trails in northern California. It is somewhat larger than Brandy City, and, in common with the mining town of Sierra county, it boasts of a brass band.

Among its mines, the Cleveland Co., half a mile below town, is making good progress. It gives employment to about 50 men during the water season, and about a dozen the remainder of the year. The company has just cleaned up, and is preparing for the next season. The ground is very rocky, and has been worked over twice, and must be extremely rich to justify the outlay of the present owners.

Union Hill claim has just closed for want of water. The season has been unusually short, as work was not begun until the middle of May. A few men will be kept at work running bedrock cuts and powder drifts. On the same lead, about a mile to the southward, is the Fairplay Co. It is one of the oldest mines in Scales' Diggings, and has always paid good dividends to its owners. The company has just cleaned up for the season, and will shortly resume work for the coming season.

Poverty Hill claim, a drift mine, about three miles north of town, is one of the most productive properties in the vicinity of Scales'. For several years the dividends from this mine have averaged \$50,000. The company has just finished cleaning up, with a handsome result.

St. Louis.

This little town, which ought to be called Phenix, has been burned some 13 times since 1853. It has a population of less than 100 whites, and a large number of Chinese.

The Donahue claim, about half a mile east of town, is the most important mine in the camp. During the season of water it gives employment to 125 persons, a large part being Chinese. The company has worked a large area of ground this season, and is now cleaning up. A short distance below the town are some drift gravel claims, from which the owners are getting good pay. The work in these mines is done principally by Chinese.

Gibsonville.

This town is just recovering from the recent fire, which nearly swept off all its buildings, both business and residence.

About a mile and a half east of the town the Niagara Con. Company is working in its lower tunnel, some 2,000 ft. long. The upper tunnel is 3,000 ft. long, and is still pushing ahead. The company employs about 50 men. It has lately finished a satisfactory clean-up. On the Michigan claim, on which the owners have been at work about seven years, they are still driving the main tunnel, which is some 3,000 ft. long, and expect to tap the channel in the course of 150 ft. The Union company is also a drift claim, with a tunnel about 2,500 ft. long. During the past year the company has breasted 1,200 ft. at the mouth of the tunnel. It has recently finished cleaning up, and will resume work on the main tunnel.

The Gravel Hill claim, about a half mile east of town, is an important property. The company has cleaned up for the season, having washed much less gravel than usual. The mine is in good condition for the coming season, however, and the bedrock cut is deep enough for several years' work. The company works

about 40 hands, and uses 3,000 inches of water. Two powerful monitors work night and day during the water season. The pressure is 200 ft., and as the gravel is free, an immense body is washed during a run of 100 days. The company owns three water ditches, one of which is four miles long, and has a large tract of land.

There is also the Squire claim, a drift gravel mine with a tunnel about 1,000 feet long, from which the owners are taking gravel worth \$1 to the car load, and have water enough to wash the year round. The somewhat famous Boot-jack gravel claim has been closed for some time on account of the volume of water; but there is a good prospect that it will be re-opened shortly. And the Horace Taber claim, also closed, is about to resume work.

Howland Flat.

This is the largest town in the northern part of the county, and boasts of two hotels. Among the population there are nearly 400 Chinese, who are mainly employed in the mines.

The Virginia claim at Potosi, about half a mile from the town, is an incorporated company. It has a tunnel 2,500 feet long. The late clean-up of the company averaged \$5 to the car load. The ground is soft, and the owners expect to strike much richer gravel in a short time.

The claim of Chittenden, Jackson and Small, a short distance below the town, is conceded to be the richest hydraulic property in the vicinity. The owners have been at work during the year on a bedrock tunnel, 22 feet lower than the old one, which will give them a considerable area of new ground. They have just finished the season's clean-up.

The Bonanza claim is situated just above the Virginia, and adjoins the celebrated Keystone mine. Work was begun in the tunnel about two years ago, and last January pay gravel was struck, since which time over \$6,000 have been taken out. The work is carried on by two shifts of 20 men each.

At the claim of Cox & Co., they have cleaned

The Silkworm Cocoon and Moth.

Now that the silken industry seems fairly given over to our sisters, our cousins and our aunts, and the burden of developing the possibilities of sericulture in this country has been accepted by them, the subject takes on new interest. The new phase of the old problem will no doubt attract the attention of many who do not know the difference between a silkworm and a tent caterpillar, and we have thought it timely to give engravings of a common species of silkworm cocoon and moth, with brief descriptions of the transformations of the insect. We take these mainly from the writings of Prof. C. V. Riley, who is a firm believer in household silk culture.

The egg of the silkworm moth is called by silk-raisers the "seed." It is nearly round, slightly flattened, and in size resembles a turnip seed. Its color when first deposited is yellow, and this color it retains, if unimpregnated. If impregnated, however, it soon acquires a gray, slate, lilac, violet, or even dark green hue, according to variety or breed. It also becomes indented. As the hatching point approaches, the egg becomes lighter in color, which is due to the fact that its fluid contents become concentrated, as it were, into the central, forming worm, leaving an intervening space between it and the shell, which is semi-transparent. Just before hatching, the worm within becoming more active, a slight clicking sound is frequently heard, which sound is, however, common to the eggs of many other insects. After the worm has made its exit by gnawing a hole through one side of the shell, this last becomes quite white. Each female produces on an average from 300 to 400 eggs, and one ounce of eggs contains about 40,000 individuals. It has been noticed that the color of the albuminous fluid of the egg corresponds to that of the cocoon, so that when

days more, by a final molt, into the chrysalis state.

The cocoon, Fig. 2, consists of an outer lining of loose silk, known as "floss," which is used for carding, and is spun by the worm in first getting its hearings. The amount of this loose silk varies in different breeds. The inner cocoon is tough, strong, and compact, composed of a firm, continuous thread, which is, however, not wound in concentric circles, as might be supposed, but irregularly, in short figure of 8 loops, first in one place and then in another, so that in reeling several yards of silk may be taken off without the cocoon turning round. In form, the cocoon is usually oval, and is color yellowish, but in both these features it varies greatly, being either pure silvery-white, cream or carmineous, green, and even roseate, and very often constricted in the middle.

The chrysalis is a brown, oval body, considerably less in size than the full-grown worm. In the external integument may be traced folds corresponding with the abdominal rings, the wings folded over the breast, the antennae, and the eyes of the inclosed insect—the future moth. At the posterior end of the chrysalis, pushed closely up to the wall of the cocoon, is the last larval skin, compressed into a dry wrad of wrinkled integument. The chrysalis state continues for from two to three weeks, when the skin bursts and the moth emerges.

The moth is shown in Fig. 3. With no jaws, and confined within the narrow space of the cocoon, the moth finds some difficulty in escaping. For this purpose it is provided, in two glands near the obsolete mouth, with a strongly alkaline liquid secretion, with which it moistens the end of the cocoon and dissolves the hard, gummy lining. Then, by a forward and backward motion, the prisoner, with crimped and damp wings, gradually forces its way out, and when once out the wings soon expand and dry. The silken threads are simply pushed aside, but enough of them get broken in the process to render the cocoons from which the moths escape comparatively useless for reeling. The moth is of a cream color, with more or less distinct brownish markings across the wings, as in Fig. 3. The males have broader antennae or feelers than the females, and may by this feature at once be distinguished. Neither sex flies, but the male is more active than the female. They couple soon after issuing, and in a short time the female begins depositing her eggs, whether they have been impregnated or not.

Domestication has had the effect of producing numerous varieties of the silkworm, every different climate into which it has been carried having produced either some change in the quality of the silk, or the shape or color of the cocoons, or else altered the habits of the worm. Some varieties produce but one brood in a year, no matter how the eggs are manipulated; such are known as *Annals*. Others, known as *Bivoltins*, hatch twice in the course of the year; the first time, as with the *Annals*, in April or May, and the second, eight or ten days after the eggs are laid by the first brood. The eggs of the second brood only are kept for the next year's crop, as those of the first brood always either hatch or die soon after being laid. The *Trevoltins* produce three annual generations. There are also *Quadrivoltins*, and, in Bengal, a variety known as *Dacey*, which is said to produce eight generations in the course of a year. Some varieties molt but three times, instead of four, especially in warm countries and with *Trevoltins*. Experiments, taking into consideration the size of the cocoon, quality of silk, time occupied, hardness, quantity of leaves required, etc., have proved the *Annals* to be more profitable than any of the *Polyvoltins*, although *Bivoltins* are often reared; and Mr. Alfred Brewster, of San Gabriel, Cal., says that he found a green Japanese variety of these last more hardy than the Chinese *Annals*. Varieties are also known by the color of the cocoons they produce, as greens, or whites, or yellows, and also by the country in which they flourish. The white silk is the most valuable in commerce, but the races producing yellow, cream-colored or flesh-colored cocoons are generally considered to be the most vigorous. No classification of varieties can be attempted, as individuals of the same breed exported to a dozen different localities would, in all probability, soon present a dozen varieties. The three most marked and noted European varieties are the *Milaoese* (Italian) breed, producing fine, small yellow cocoons; the *Arche* (French), producing large yellow cocoons; and the *Brousse* (Turkish), producing large white cocoons of the best quality in Europe. Owing to the fearful prevalence of *pebrine* among the French and Italian races for 15 or 20 years back, the Japanese *Annals* have come into favor. The eggs are bought at Yokohama in September, and shipped during the winter. There are two principal varieties in use, the one producing white, and the other greenish cocoons, and known respectively as the *White Japanese* and the *Green Japanese Annals*. These cocoons are by no means large, but the pods are solid and firm, and yield an abundance of silk. They are about of a size, and both varieties are almost always constricted in the middle (Fig. 4, c, green, d, white.) Another valuable race is the *White Chinese Annual* (Fig. 4, e), which much resembles the *White Japanese*, but is not as generally constricted. Fig. 4, a and b, represent, respectively, *White* and *Yellow French Annals*.

The heir of the Spanish throne will be baptised in water from the river Jordan, presented in a bottle, for that purpose, by M. Montilla, the Spanish Minister at Constantinople,

FIG. 1.



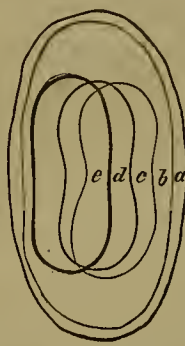
FIG. 2.



FIG. 3.



FIG. 4.



SILKWORM, COCOON AND MOTH, WITH COCOONS OF DIFFERENT VARIETIES.

up for the season, and are pushing work for the next. At Poker Flat—which has been made famous by Bret Harte—there is an hydraulic mine worked by four partners. They are cleaning up, and expect to realize \$4,000 each from the last run.

Port Wine.

This town, with the suggestive name, has a population of 100 persons, and has four saloons and three hotels. The water supply failed a short time since, and the miners are busy with their clean-ups. One of these, the Indian Queen, a short distance east of the town, employs 20 men. At Wahoo camp, across the ridge from Port Wine, several gravel mines are operating on a small scale.

DEVASTATION OF A BUSH FIRE.—A dispatch from a village in the Province of Quebec, Upper Canada, of September 8th, says a terrible fire took place there on Monday and carried ruin and death in its track. Bush fires have been numerous for some time, and little attention was given to them. The high wind Monday fanned the flames until the inhabitants, about 6 o'clock, saw with dismay a wall of flames come toward them with steady sweep, as fast as a man could run, and swallowing up everything in its course. By 4 o'clock the first farmhouse had been reached, and the fire ran along the rail fences burning grain, and the wind sent sparks in all directions. So quickly was one farmhouse and another enveloped, that men, women and children had barely time to escape out of its line. As night grew on the flames increased in volume, while the wind rose, and for a space of about 12 miles in length and in width from 3 to 4 miles, the eye rested upon nothing but roaring flames. About 75 families, representing 450 persons, have been burned out. Four persons are known to have been burned, and a large number is missing. The loss is estimated at \$300,000. The disastrous fire was caused by a farmer who was burning stubble.

NOT SO SMALL.—In an advertisement in last week's PRESS of a pumping engine for sale by Manuel Eyre, it was stated that the cylinder was 1-inch and stroke 6-inch. The true dimensions are 16-inch cylinder; 6-inch stroke. The advertisement in correct form may be found in this issue.

the fluid is white the cocoon produced is also white, and when yellow the cocoon again corresponds.

The larva, or worm, is shown in Fig. 1. The worm goes through from three to four molts or skinchanges, the latter being the normal number. The periods between these different molts are called "ages," there being five of these ages, including the first from the hatching and the last from the fourth molt to the spinning period. The time between each of these molts is usually divided as follows: The first period occupies from 5 to 6 days, the second but 4 or 5, the third about 5, the fourth from 5 to 6, and the fifth from 8 to 10. These periods are not exact, but simply proportionate. The time from the hatching to the spinning of the cocoon may, and does, vary all the way from 30 to 40 days, depending upon the race of the worm, the quality of the food, mode of feeding, temperature, etc.; but the same relative proportion of time between molts usually holds true.

The color of the newly hatched worm is black or dark gray, and it is covered with long, stiff hairs, which upon close examination will be found to spring from pale-colored tubercles. Different shades of dark gray will, however, be found among worms hatching from the same batch of eggs. The hairs and tubercles are not noticeable after the first molt, and the worm gradually gets lighter and lighter, until, in the last age, it is of a cream-white color. When full grown it presents the appearance of Fig. 1. It never becomes entirely smooth, however, as there are short hairs along the sides, and very minute ones, not noticeable with the unaided eye, all over the body.

Having attained full growth, the worm is ready to spin up. It shrinks somewhat in size, voids most of the excrement remaining in the alimentary canal; acquires a clear, translucent, often pinkish or amber colored hue; becomes restless; ceases to feed, and throws out silken threads. The silk is elaborated in a fluid condition in two long, slender, convoluted vessels, one upon each side of the alimentary canal. As these vessels approach the head they become less convoluted and more slender, and finally unite within the spinneret from which the silk issues in a glutinous state and apparently in a single thread. The glutinous liquid which combines the two, and which hardens immediately on exposure to the air, may, however, be dissolved in warm water. The worm usually consumes from three to five days in the construction of the cocoon, and then passes, in three

Explosive Mixtures of Air and Gas.

The recent explosions of gas in England, and notably the serious one in London, have naturally drawn attention to the question what admixture between gas and air is most strongly explosive. It appears that there is some conflict of opinion on the subject. According to the report in the London *Times*, it was stated by Mr. Foster, the chemist, at the inquiry respecting the death of the men who were killed by the gas explosion, that "the maximum admixture to make an explosion would be one part of gas to eight parts of air, and this would compose the admixture which exploded on Monday, the 5th ult., while one part of gas to seven parts of air would make a less explosive mixture." It is not to be supposed that all chemists would agree with Mr. Foster in these proportions. The ratio between air and gas to form an explosive mixture is more generally supposed to be 1 in 10. The subject was investigated at great length before a committee of the House of Commons in 1867, when the Metropolitan Board of Works introduced their Subways bill. Some of the first chemists and gas engineers were examined. Dr. Frankland, in his evidence, said that 1 part of gas to 10 of atmospheric air constitutes the most explosive compound, the lowest mixture which it is possible to explode being 6.6% of gas. This mixture ceases to be explosive and becomes combustible when in the proportion of one to four or four and a half, according to the quality of the gas. Mr. Forster, the mining engineer, who was opposed to the bill, stated that he found, from experience, that the most explosive mixture was about eight or nine volumes of air to one of gas, but in another part of his evidence the proportion is said to be one to seven or eight. Mr. H. E. Jones, the gas engineer, considered that from 10 to 12 would be most destructive, but Mr. R. Jones said that there would be nothing dangerous up to one in five; it would be dangerous at one in nine, and very dangerous at 1 in 10. Mr. Bramwell, who made experiments of every proportion, was of opinion that about 10% is the maximum of explosiveness, but if it amounted to 20%, an explosion would no longer take place. When the gas becomes a fourth part of the air, the possibility of explosion ceases. —*Iron Age*.

A WONDERFUL BLIND MAN.—James Goodsell, who had been blind from his birth, died recently in Burlington, Conn. His wonderful career is thus sketched by the *Waterbury American*: In early childhood, however, Mr. Goodsell said that the darkness was in a few instances broken by faint glimmerings of light. Of four children, he and a sister were blind; the others could see. The sister, though at first possessed of ordinary vision, soon by a mysterious change became wholly deprived of sight. In absolute darkness, this ordinary employment of work-a-day life would seem impracticable, but this blind man would swing an axe with the dexterity of a woodsman, and actually felled trees; he was an accomplished grain thrasher, and would frequently go alone a distance of two miles to thresh for the Burlington farmers, climbing the mows to throw down the grain; he could hoe corn or garden stuffs as good as anybody, having no trouble to distinguish the weeds. He could set a hundred bean poles with more accuracy than most people who could see; would load hay beautifully, and was so good a mechanic that he manufactured yokes and other farm articles with success. He had an excellent memory, and was an authority on facts and dates. He could generally tell the time of day or night within a few minutes. One instance is given when he slept over one day and woke at evening, thinking it was morning. For once he ate supper for breakfast, but when informed of his mistake he slept another 12 hours in order to get straight again. He was familiar with forest trees, and knew just where to go for any timber desired. He could direct men where to find a chestnut, a maple or an oak, and the children where to go for berries. He was a good mathematician, and could compute accurately and rapidly. In olden days he was quite musically inclined, and, like most blind people, he had a genius in that direction.

HOW TO LAUGH.—As to laughing, how seldom, except on the stage, do we hear a really musical laugh! Some girls make dreadful grimaces when they laugh. A little education in the art would not make it artificial, and they would surely enjoy it all the more if they could realize that they might indulge in mirth without making themselves look so very ugly, as is occasionally the case. It runs in families sometimes to distort the countenance in laughter. I know a family who laugh a great deal. Their eyes always shut up when they do so, and it is the funniest thing when one dines with them and something amusing is said, to look round the table and see exactly the same distortion on every face. There is not an eye left in the family. Three sisters whom I know show quite half an inch of pale pink gum when they laugh. In their presence, like Wendell Holmes, one "never dares to be as funny as one can," for fear of seeing this appalling triple vision of gums. A little training in childhood would make their laughter a pleasant thing to look at, for they have all pretty little square teeth, very white and even. Henry Ward Beecher says: "A good laugh is worth a hundred groans in any market," and I am sure a pretty one is worth a thousand. —*London Truth*.

A Remarkable Case of Somnambulism.

Prof. Fischer describes a remarkable case observed by himself and others, when a boy at school. A young man, apparently of a hale constitution, and far from exhibiting any symptoms of a nervous temperament, was habitually subject to somnambulism. His fits came on regularly about 10 o'clock at night. The scene was a large apartment, containing 60 beds in four rows. He ran about violently, romped, wrestled and boxed with his companions, who enjoyed the sport at his expense. "I think," says this Professor, "I can perfectly well remember that, while running, he always held his hands before him, with his fingers stretched out. He was remarkable agile, and would leap over the beds, and his companions could scarcely ever catch him. When he escaped through the door, he flew through a long gallery to his own apartment. There he rested, frequently taking up a book and reading softly, or with a loud voice conducting—if my recollection serves me accurately—his outstretched fingers over the lines. His eyes were alternately open and closed; but even when open they were incapable of vision, being convulsively drawn upward, showing only the whites. The general belief that somnambulists see by means of the points of their fingers, as well as the observation that while running our somnambulist always carried his hands and outstretched fingers before him, as if these were his organs of sight, as also his reading (as it appeared to us) by means of the points of his fingers, led us to the idea of tying gloves upon his hands and stockings upon his legs. Besides, we had been informed that during his nightly wanderings he had been known to play at skittles—a game he was very fond of when awake—and that he had always accurately counted the number of pins knocked down by stretching out his fingers in a direction toward them, so correctly, indeed, that it was impossible to deceive or impose upon him. In short, we seized the opportunity of his most profound sleep and insensibility to tie on the gloves and stockings. At this usual time he rose up and sprang out of bed; but although we began to tease and provoke him, he did not move from the spot, but appeared puzzled and perplexed, and groped and tumbled about like a blind or drunken man. At length he perceived the cause of his distress, and tore off the gloves with great violence. Scarcely were his hands uncovered when he started up in a lively manner, and threw the gloves with ironical indignation upon the ground, making a ludicrous observation upon the means taken to blind him; and then he began to run through the apartment as formerly." —*N. Y. Mail*.

LIABILITY FOR INJURIES TO RAILWAY EMPLOYEES.—In connection with the discussion in England of the Employers' Liability Bill, the advocates of that measure have issued a paper describing the laws in force in France and Germany. It states that in Germany an Imperial law, passed June 7, 1871, and extended in 1872 to Alsace-Lorraine, contains a provision "that if any person is killed or hurt in the working of a railway, the proprietor is liable for the injury inflicted, so far as he cannot prove that such injury was inflicted by a higher power or by the fault of the person so killed or injured." A similar system exists in regard to mines and manufactures, and it is said to be common in portions of Germany for employers to club together to form accident insurance societies for the purpose of insuring the lives of their workmen. In France a general law applicable to employers, which also governs the operations of railway companies, contains a provision that "a person is responsible not only for the injury caused by his own act, but also for that which is caused by the act of persons for whom he is bound to answer, or by things which he has under his care." The French railway companies have established provident institutions for the benefit of their employees; but it is stated that even this precaution has not prevented frequent litigation in cases where men have been injured while engaged in the performance of their accustomed duties. —*Railway World*.

TO MAKE A STRONG PASTE.—To make a paste for fastening bills in a file book, or for any purpose where a very strong paste is desired, the following recipe is recommended: Rice or starch paste is the best. Four parts (by weight) of fine glue are allowed to soften in 15 parts of cold water, and then moderately heated until the solution becomes quite clear; 65 parts of boiling water are now added, with constant stirring. In another vessel 30 parts of starch paste are stirred up with 20 parts of cold water, so that a thin milky fluid is obtained without lumps. Into this the boiling glue solution is gradually stirred, and the whole kept at a boiling temperature for a short time. After cooling a few drops of carbolic acid are added to the paste. This paste is exceedingly adhesive, and may be used for leather as well as for paper and card-board. It should be preserved in corked bottles to prevent evaporation, and in this way will keep good for years.

NEW CANAL IN CHILE.—The *Chilean Times* announces the completion of the Canal de la Merced. The canal is 75 miles long, and has been 25 years in construction. It is considered one of the most important works executed in Chile. It has cost about \$400,000.

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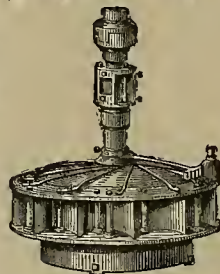
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING AUGUST 31st, 1880.

231,776.—HOISTING MACHINE BRAKE.—W. E. Eckart and H. C. Behr, S. F.
231,806.—THRUSHING MACHINE.—C. A. Jenkins, Sacramento, Cal.
231,850.—SCRAPER.—A. Rewrick and J. D. Gilmour, S. F.
231,849.—KEY-BOARD.—C. C. Reynolds, Kelseyville, Cal.
231,687.—WATER-CLOSET TANK.—W. Smith, S. F.
231,693.—CONVERTING SCRAP INTO BAR STEEL.—S. Wren, Sacramento, Cal.
231,874.—BOILER.—J. B. Ward, S. F.
9,309.—(reissue) WHEELBARROW.—W. McKibbin, S. F.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

SUGAR MOLDING MACHINERY.—William H. Wiester, S. F. Patented August 24, 1880. No. 231,638. In this machine the molds are filled, their contents discharged in molded form onto plates on a belt; delivering them to the drying room. The loose particles of sugar are pushed off, the molds are washed and their sliding bottoms pushed back in place ready to receive their next charge. This operation is rapid and continuous and automatic, requiring no attention or skill on the part of the attendants.

RUDDER.—Uriah B. Scott, Portland, Oregon. Patented August 24, 1880. No. 231,623. This invention relates to certain improvements in that class of rudders known as "balanced" rudders, such as are commonly used on light-draft stern-wheel river steamers; and the improvements consist in providing a curved or bent rudder stock, so that when the rudder is turned it will fit close to the bottom of the boat at all points of its swing, thereby preventing drift-wood or other obstructions getting between the rudder-plates and bottom of the boat.

The Pacific Coast Steamship Co.

One of the most important factors which has aided in developing the southern parts of this State is the Pacific Coast Steamship Co. It is now some 15 years since this company commenced operations on a very small scale, but after a while they ran so strong an opposition to the Pacific Mail Steamship Co., that in 1873 the latter sold out the whole coast line to the new company. At that time the Mail Co. was running two steamers to San Diego, and the Pacific Coast Co. was running but one.

For a good many years previous to this most of the coast trade at the smaller southern ports was carried on by sailing vessels, mostly schooners. At the larger places the Mail Co. stopped, but the schooners did a very thriving trade. This was not very satisfactory to the people, however, as there was no regularity and very often their cargoes were damaged.

When the Pacific Coast Steamship began running all this was changed. Five large, elegant and finely equipped steamers took the place of the schooners. The service became regular and rates of freight and passage were lowered. Considering the distances and amount of traffic, the Steamship Co. consider that the freight is lower on the southern coast of California than on the Eastern seaboard south of New York for same distances, saying nothing of the difference in population and the fact that not one ton of freight is carried here for 20 tons there.

As far as communication is concerned, many of the places on the coast have been made by the Steamship Co. The convenience of shipping has brought the land up to good prices and given an opportunity for the crops to be readily marketed.

The company own a fine fleet of steamers, many of them upwards of 1,500 tons burden. It exercises an important influence on southern California. Many of the landings are expensive to keep up, and altogether the circumstances under which freight is handled causes considerable expense. The steamers of this company also run north to Oregon and all points along the coast, where a very flourishing business is done.

NEW mines have been discovered in El Dorado canyon, San Bernardino. Ore from the Lone Star mine assays \$2,000 per ton, ore from the Savage \$1,720, and ore from the Morning Star \$5,900, with others up in the hundreds.

AN exhibit at Little Rock, Ark., of silver bullion from ores of the Montgomery county silver mines has created much excitement there.

Mechanics' Fair Notes.

Culver's Elevator.

Mr. James H. Culver, the accommodating Secretary of the Mechanics' Institute fair, is also an inventor, and exhibits at the southwest corner of the pavilion, near the stairway, an improved safety device for elevators, which while simple, exhibits considerable ingenuity. The invention consists in constructing at the bottom of the elevator well an open topped hollow box, into which the elevator may fall in case the rope breaks or unwinds, and the ordinary safety clutches do not act.

This box has suitable discharge openings for the air to pass out gradually where the elevator or cage drops into it, and the partially confined air acts as a cushion into which the cage falls, so that its speed is checked gradually, and no harm results to the occupants of the cage. Springs may also be placed in the bottom of the box, which will also tend to lessen the force of a fall. It is well known that cages will frequently fall when the rope does not break but unwinds from the reel. When this occurs the safety clutches seldom act, and the cage is precipitated.

By having this air chamber or box at the bottom of the elevator well should any accident of any kind happen, and the cage be precipitated downward, instead of the cage being broken to pieces and the occupants killed or maimed, it strikes on a cushion of air and is gradually brought to a stand-still.

As the floor of the cage or elevator first strikes into the box the air is compressed, and begins to issue from the discharge opening, the opening gradually being reduced in size as the cage goes lower, while at the same time the air is more and more compressed. This action has the effect of slowing down the motion so gradually that no harm can occur to the cage or its occupants. As the cage nears the bottom it meets the springs, which it compresses, and is then brought to a stop.

By thus falling on to an elastic compressible cushion of air no jar or shock is experienced, as is the case where the elevator strikes on to a floor or timber at the bottom of the well.

There is no mechanism in this safety apparatus to get out of order, and it works very smoothly. A bucket of water is placed on the elevator at the fair and the cage dropped, the water not being spilled, which shows how smoothly the cage is brought to a stand-still. Mr. H. B. Herrick has the elevator on exhibition.

Betts' Springs.

Among the flourishing home industries represented at the Mechanics' fair is that of the manufacture of carriage springs. The Betts Spring Co., the only one here exclusively engaged in this branch of business, make a very handsome display of different varieties of springs, made even more creditable from the fact that many original improvements are incorporated in the work.

All of these springs are made of the best refined English steel, which is imported in long bars, from one and a half to four inches wide, the edges being slightly rounded off, ready to make up. In the process of manufacture, while the leaf is being formed a "lip" is made on the leaf. This "lip" is a very important improvement over the old-fashioned way of making light springs, and is an invention of Mr. Betts. Formerly, in placing one leaf above another, it was necessary, in order to keep them in position, to cut two slots and punch two teats in each leaf, which, of course, weakened the spring. Each of these slots was about half an inch long, and, in making the two in each leaf, the piece of steel was frequently broken, and always weakened. The teat or projection in each side of the center of the leaf fitted into corresponding slots in the leaf below it, thus preventing the leaves from getting out of position. The "lip" invented by Mr. Betts is simpler, and answers the purpose better, without weakening the leaf in the slightest degree. It consists of a slight projection formed on the side of the spring, a short distance from each end. This being formed on each leaf, laps down beside each lower leaf, each one assisting to keep the other in position, and preventing lateral motion. These lips, therefore, do away with the slot and teat, and the springs never give way where the lip is. The machine for forming the "lip" was devised by Mr. Betts.

Most of the machinery for carrying out the different operations in the manufacture of these things has been designed by the proprietors, and is of their own construction. The business has been established on the quality of the work performed, no outside assistance having been rendered, and they have succeeded in introducing these springs almost everywhere on the coast. The works were established here some thirteen years since, with one man and a boy; now they give employment to a large number of hands, and supply all the wagon and carriage-makers in this city with springs, as well as sending quantities of them to the interior and all over the coast. In the display in the fair are shown the different varieties of springs made by the company.

The Glass House.

Probably the most unique of the many noticeable displays in the fair is the artistically arranged collection of cut, stained, bent, embossed and painted glass, which has the appearance, as a whole, of a finely finished glass house. It is elegantly arranged, and attracts considerable attention as the product of a home industry of a peculiarly artistic character.

Among the many fine specimens of embossed glass the representation of the seal of California is perhaps the most prominent. It is handsomely encased in a frame of fine etched architectural work. In fact the architecture is made up of myriads of fine lines and curves, and deserves special mention. The glass is silvered, and answers partly as a mirror. The delicacy and exactness of the whole picture places it in a high order of art.

The variety of figured colored windowes for churches commands attention, as does the glass painting for house decoration. The cut glass department exhibits some unique monograms, door lights and leveled glass. John Mallon, 19 Fremont St., and 1213 and 1215 Howard St., is proprietor of the works from which this glass is turned out, and deserves great credit for the progress shown in his art. He has been in the business here for some 23 years, and has furnished the ornamental and bent glass for nearly every elegant mansion in the State, the latest large job being that in the mansion of J. C. Flood, Esq., at Menlo Park.

Henricksen's Safety Clutch for Elevators.

B. E. Henricksen exhibits in operation at the fair an elevator which is provided with his patent safety clutch, a device intended to catch and sustain the cage in case the hoisting rope breaks or the hoisting apparatus is deranged. Trip levers are pivoted to the frame of the cage and have toothed cams at their lower end. They are inclined outwards, and have at their upper ends rollers which bear against irregularly-formed cleats or horses on the sides of the guide posts. At the ordinary rate of speed these rollers move along on the edge of the cleats, these cleats being formed in wave lines.

Should the cable part, or any portion of the machinery break, the rollers are brought in violent contact with the cleats, which, having a sharp incline on the top part, will throw the trip levers over and bring the clutches or cams in violent contact with the guide posts, so that they engage with them and act as brakes or safety levers, preventing the cage from falling further. The eccentrics or cams are toothed and form a powerful brake, which increases in power in proportion to the strain which is brought upon them.

The operation of this device depends on speed alone. At the ordinary rate of speed the cams are not brought into action. The moment, however, that the speed becomes too great for safety, the trip levers operate and the cage is stopped. This device is in use on elevators in the following buildings: Johnson building, No. 120 Sutter St.; Thurlow block; S. F. Stock Exchange; No. 545 Market St.; W. Cohn, northwest corner of Battery and Bush Sts.; W. & J. Sloan, 545 Market St.; J. Carl & Co., 517 Market St.; Halleck block; California Furniture Company, 226 Bush St., etc.

Domestic Sugar.

The Standard Sugar Manufacturing Co. have on exhibition at the Market St. end of the Pavilion near the stairway, samples of sugar made from beets at their works at Alvarado, Alameda, Co., that will compare favorably with any sugar from the refineries of this city or from the East.

But few people are aware of the enormous quantities of sugar annually imported into this country. The people of the United States send to foreign countries every year nearly \$100,000,000, for sugar that no doubt could, and should be produced at home. If this was done, that large amount would be distributed among our own people, instead of being sent abroad to enrich the subjects of foreign nations.

And no doubt this desirable result would have been attained years ago had our Government pursued as liberal a policy to encourage this important industry as those foreign nations that now, not only produce a sufficient amount of sugar from beets to supply their own wants, but have a large surplus for export.

A strong prejudice has naturally existed in this community against beet sugar. Until this company commenced operations (which was only last year), either from a lack of knowledge or proper machinery, sugar manufacture from beets has not been properly refined. Sugar from cane, refined in the same manner, would have given no better satisfaction. Sugar produced from the beet and cane, are chemically the same and are known in chemistry as cane sugar, only, and are equally pure when properly refined. It is claimed, however, that beet sugar contains less glucose than that made from sugar cane and is really sweeter and more pure, when properly refined.

If a good quality of sugar can be manufactured from raw material produced in our own country in sufficient quantities for home consumption, it should receive every possible encouragement.

WALKING ON WATER.—At Milwaukee, on the 7th inst., a young Norwegian named Rosendahl gave an exhibition of walking on the water, which is described as a complete success. Attached to the young man's feet were two floats, or "boat-like structures," by the aid of which he is said to have walked easily and quite rapidly on the surface of the water. His movements were an actual walking motion; it was not a dragging motion, but a straightforward walk at the apparent rate of three miles an hour. At the time of the experiment a passing tug-boat caused quite a swell on the water without, however, disturbing the action of the walker. The feat was performed in the presence of thousands of spectators.

News in Brief.

A NEW and fatal cattle disease has broken out in Kentucky.

THIS year the American cotton crop is the largest ever raised.

THE port of Fusan, in the Corea, has been opened to Italian commerce.

PETER CAMPBELL, of Bridgeport, challenges the world to a whistling match.

ATTEMPTS are making to circulate \$50 forged American bank notes in London.

THE bones of a mastodon were recently examined in Washington county, Or.

O. F. DAVIS, a telegraph operator, was killed on the railroad near Pantana, Arizona.

DR. HAYES, the Arctic explorer, expresses his belief in the safety of the Jeannette.

THE volume of Kern river is three times greater than at the same time last year.

JOSEPH HANCOCK was suffocated by foul gas in the New Almaden mine on the 31st of August.

WILLIAM H. GREENWOOD, an American railroad engineer, was murdered in Mexico on Aug. 29th.

THE young man of the period allows his mind to run on monkey jackets and polka dotted socks.

NINETY-SEVEN lives were lost by the giving away of the pontoon bridge over the river Ebro, Spain.

A FARMER states that a corn-cob is better than any brush for cleaning woolen clothes from mud and stains.

LONDON placards announce that Spurgeon's figure has been added to Madame Tussaud's wax-works.

MANUEL SILVA, of Pajaro, has threshed a field of wheat which is said to have yielded 103 bushels to the acre.

THE "Queen's Printer" in England has a monopoly of the business of printing and publishing the Bible.

SRUZZON is a noted Indian village on the Fraser river. It is the home of a thrifty and christianized tribe.

GEORGE TUCKER, an inmate of Auhurn prison, has just inherited \$12,000. His sentence will expire in 1885.

JOSEPH COLE, of Central Point, Merced, has lost inside of three weeks over 300 chickens by the sneaking coyote.

CONSIDERABLE attention is being paid to raising silkworms in Amador county, and they are said to thrive well there.

MISS JOSEPHINE TAYLOR, daughter of the head of the Mormon church, has fled from her home to escape polygamy.

ENGLISH Sunday schools have no picnics or festivals, and the children are less regular in attendance than in America.

It is proposed to raise \$25,000 in Petaluma and build a new and fast steamer for use on the creek route to San Francisco.

They say at the London jockey club that Mr. Lorillard's two-years' career on the English turf has cost him nearly \$200,000.

BISHOP ELDER of Cincinnati has declared that no hanged or frizzed hair will be allowed among the women of his congregation.

RESIDENTS of Livermore valley tendered a reception and picnic to the Tulare settlers, who reached that place the other day.

A PARTY of picnickers were poisoned, Sept. 21st, at Geneva lake, Wis., by eating pressed beef. Eight persons are dangerously ill.

NEGOTIATIONS are proceeding with French capitalists to raise funds in Paris for the construction of the St Lawrence tunnel.

CASTROVILLE farmers use horses to trample out their mustard seed. This does away with the employment of Chinese with flails.

SOME pretty fans are to be seen at the watering places, this year, but the loveliest is declared to be of white lace applied on a background.

THE steamer *San Salvador*, plying between New York and Truxillo, Honduras, and engaged in the cattle business, is reported to be lost.

THE Bodie stage was robbed on Sunday, Sept. 5th, and one robber was killed, a messenger was wounded, and the treasure box was taken.

It is reported that Prof. Henry L. Kendrick, of the chair of Chemistry at West Point, is about to be retired by the President under the longevity law.

MISS ALICE HARLOW, of Augusta, a recent Vassar graduate, accepts the professorship of Latin and Greek at Monticello seminary, Godfrey, Ill.

THE American humane association has deposited \$5,000 with Kidder, Peabody & Co., at Boston, to be awarded the inventor of an improved cattle car.

CUSTOMERS on a milk route in New Haven, Conn., are supplied by a woman who in all sorts of weather drives her rounds with unfailing regularity.

GEORGE MEEK, of Windsor, Sonoma Co., who was bitten by a fox, has, after much suffering died from hydrophobia, caused from the animal's saliva.

THE Illinois Central has paid more than \$36,000,000 in dividends in the last 20 years, besides reducing its funded debt to \$10,300,000 on \$45 miles of track.

AN English member of Parliament thinks that the next session promises to be fraught with very important events in connection with the woman's suffrage movement.

THE house still stands in Salem, built about 1632 by Roger Williams, in which is a low room, with solid oak beams and timbers, where the witch's trials were held, and whence many victims were led out to die.

Pocket Mining Atlas,
Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolithe. Sent, post paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

INVENTORS, and others interested, will receive DEWEY & Co.'s MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

J. G. COLMBENIL is requested to report to this office from Humboldt Co.

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Mining and Other Companies.

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DIVIDEND NOTICE.
OFFICE OF THE
Napa Con. Quicksilver Mining Company,
SAN FRANCISCO, AUGUST 30th, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 12) of Ten (10) Cents per share, was declared, payable on WEDNESDAY, the first day of September, 1880, at the office of the Company, Room 16, Academy Building, No. 330 Pine St., San Francisco, California.

W. M. W. PARRISH, Secretary.

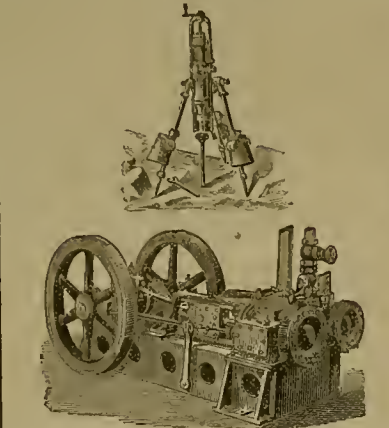
DIVIDEND NOTICE.
OFFICE OF THE
Standard Consolidated Mining Company,
SAN FRANCISCO, SEPTEMBER 1, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 19, of Seventy-Five cents (75) per share was declared, payable on MONDAY, September 13, 1880, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York.
WILLIAM WILLIS, Secretary.
Office—Room No. 29, Nevada Block, No. 309 Montgomery St., San Francisco, Cal

Gover Mining and Milling Company.—
Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.
Notice is hereby given that at a meeting of the Directors held on the Eleventh day of August, 1880, an assessment (No. 4) of 20 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 402 Front street, room 8, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the Thirtieth day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Eleventh day of October, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
W. D. WILSON, Secretary.
Office—402 Front street, room 8, San Francisco, California.

Techattucup Silver and Gold Mining Co.
Location of principal place of business, San Francisco, California. Location of works, El Dorado canyon, Lincoln Co., Nevada.
Notice is hereby given that at a meeting of the Trustees, held on the 24th day of August, A. D. 1880, an assessment (No. 7) of One Dollar per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, No. 237 First street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 20th day of October, A. D. 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
O. F. MOULTHROP, Secretary.
Office—No. 237 First street, San Francisco, California.

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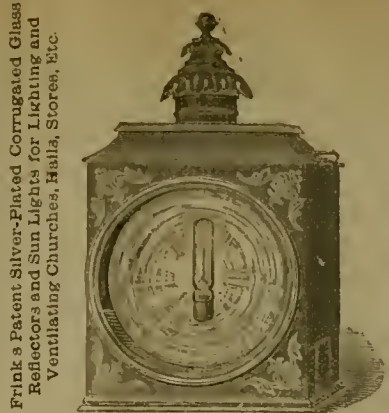


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MINING ENGINEER AND METALLURGIST.

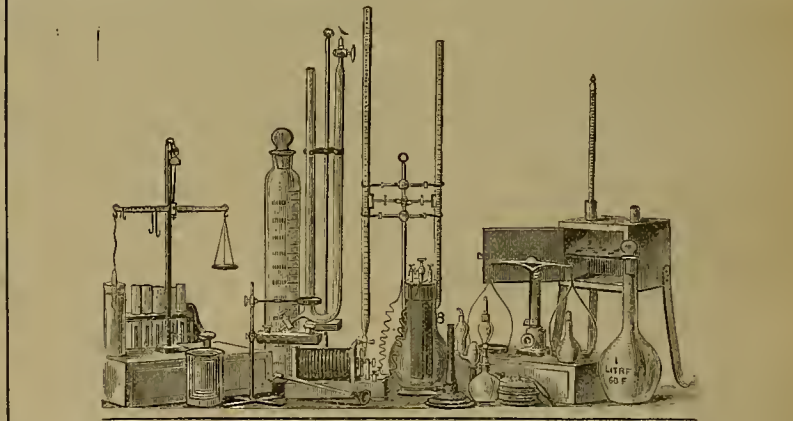
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the great lode in this city with a copy of the book for their
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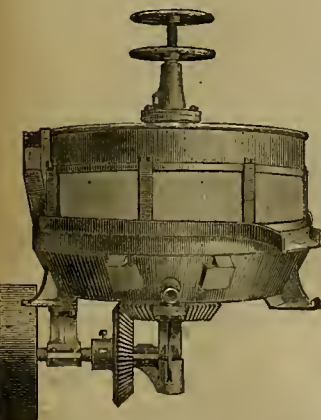
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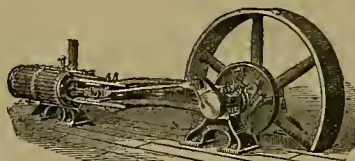
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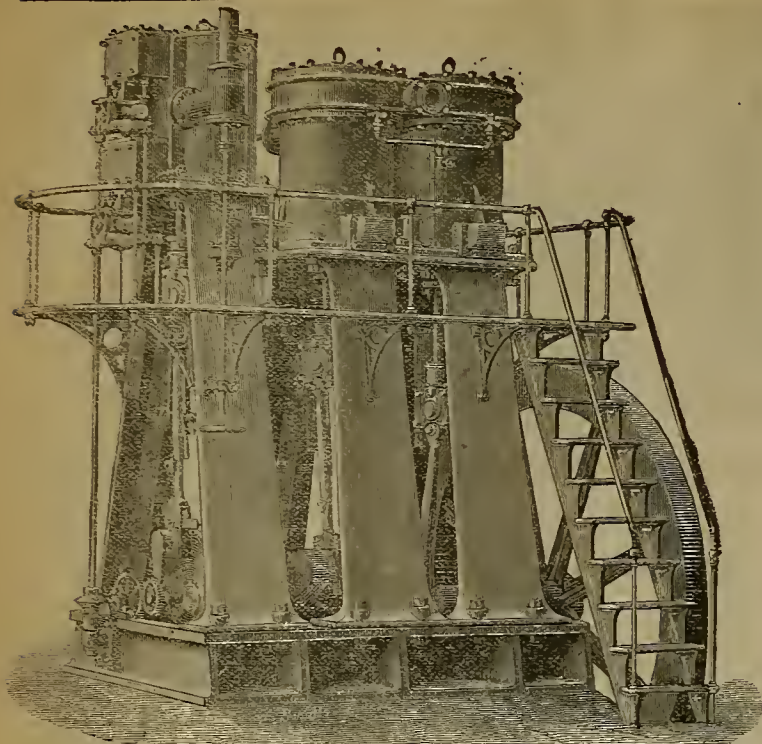
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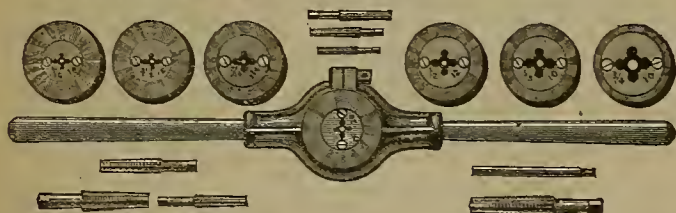
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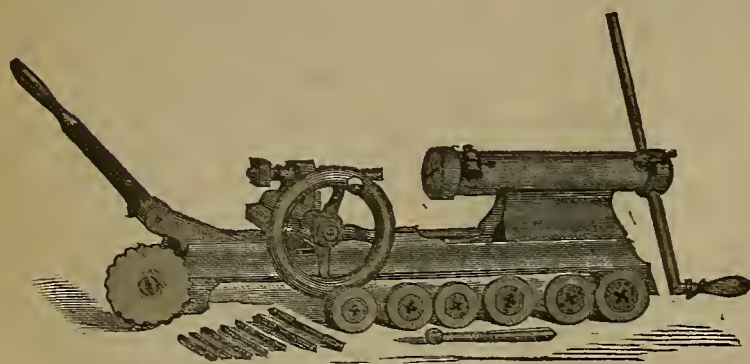
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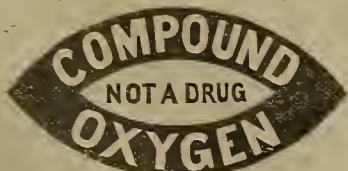


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- No. 1. — Equalling Liquid Nitro-Glycerine in Strength. We recommend this Grade in extremely hard rock, boulders, iron, etc.
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- No. 3. — For bench work, pipe-clay, soft and shelly rock, outside work and quarrying.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, SEPTEMBER 18, 1880.

VOLUME XLI
Number 12.

A New Hot Air Engine.

When the original Ericson calorific engine came out, greater things were expected of it than were ever realized; and in fact it was rather unsatisfactory. The need of such a motor, especially for small work, has long been recognized, but until lately it has seemed one among the unattainable things. The great trouble has been that the motors have been too large or too expensive, or too complicated.

Mr. Ericson has within a few months patented an improved motor, specially designed for pumping water, an engraving of which we give herewith. We examined the machine this week at H. P. Gregory & Co.'s, the agents, where a small-sized one may be seen at work, a larger size being also on exhibition at the Oakland fair. It is intended for use in places where small quantities of water are to be lifted short distances cheaply.

The engine consists of an upright cylinder, cast in one piece, the lower portion being suspended in the fire-box or furnace, while the upper portion is surrounded by a water-jacket. This cylinder is supported in the center by a simple iron table having four legs, and raised high enough to admit the furnace under the table. The furnace under the cylinder may be a small, cylindrical wood or coal stove, with a suitable chimney, or four gas-jets inclosed by a sheet-iron box, having an opening at the top for the escape of the products of combustion. The use of gas is to be preferred to coal or wood wherever it can be obtained, as it is cleaner, cheaper, and much less liable to injure the machine by overheating. That we examined at Gregory & Co.'s is run by gas. The moving parts consist of two pistons, placed one over the other in the cylinder, and their proper connections by means of a walking-beam and bell-crank. The theory of the engine is this: The lower piston, or plunger, is quite long, filling about one-third of the cylinder, and not quite touching the sides and bottom. Stud on the sides of the plunger serve to guide it in the cylinder. The upper piston fits the cylinder air-tight, or very nearly so, and moves up and down in the cylinder over a portion of the part that is water-jacketed, the upper side of the piston being exposed to the air. The rod for the plunger passes through the center of the piston-rod, and both plunger and piston move independently of each other.

On starting the fire under the cylinder the air inside becomes heated, and by giving the fly-wheel a slight push the motor starts into operation. The plunger descends quickly, driving the heated air at the lower end of the cylinder past the sides of the plunger to the upper part of the cylinder, where it meets the piston and forces it upward, and giving the first stroke to the engine. At the same time, the hot air meets the cold sides of the jacketed portion of the cylinder and contracts, makes a partial vacuum under the piston and escapes back to the lower portion of the cylinder, where it is again heated. The fly-wheel carries the plunger down again with a quick stroke that compresses the heated air, and it again expands suddenly and reacts upon the piston above, when the action is repeated. The same air is used continuously, being alternately heated and cooled, expanded and contracted; the conversion from one condition to the other developing the power required to keep the machine in motion, and enable it to do useful work. The system of cranks for controlling the movements of plunger and piston is simple, and in operation the motor works in silence. The pump is placed at the side of the cylinder, and is connected directly with the walking-beam moved by the piston. It takes the water through a suction-pipe, and passes it through the water-jacket and thence on to the discharge, the slight absorption of heat in passing through the jacket being of no particular consequence, while the fact that none of the

water passes the jacket twice insures a constant supply of cold water in cooling the cylinder. The motor is made in two sizes, the larger size with a cylinder 20 m. (8 in.) in diameter, and consuming 420 cubic decim. (15 ft.) of gas per hour, having a duty of 1,400 liters (350 gals.), raised 15.07 m. (50. ft.) an hour. It cannot explode, nor is there danger of fire, and any intelligent person may learn to use it with safety in half an hour.

SPECIMEN FROM ROCKY BAR.—The Grass Valley Union of the 14th inst. says that among the

INVENTOR OF THE TELEPHONE.—Prof. Alex. Graham Bell has received the Volta prize of the French Academy of \$10,000 for the invention of the telephone, as "the best application of electricity." Prof. Bell is also the inventor of the photophone, which he is said to regard at present as a scientific toy, as the telephone was regarded at first. The future use of the photophone will be, he thinks, between ships at sea, wrecks and the shore, and for military communication. Prof. Bell announced the possibility of producing sound by interrupting the action

A Premium for Improvements.

It must be confessed that, as a general thing, the improvements introduced in manufacturing establishments by the hands, are more apt to redound to the benefit of the "hosses" than to the individual "hand." By this we do not mean patented inventions, but such devices as simplify or expedite work, or such a modification of tools as admit their being put to more than one use, etc. While the fact that such things

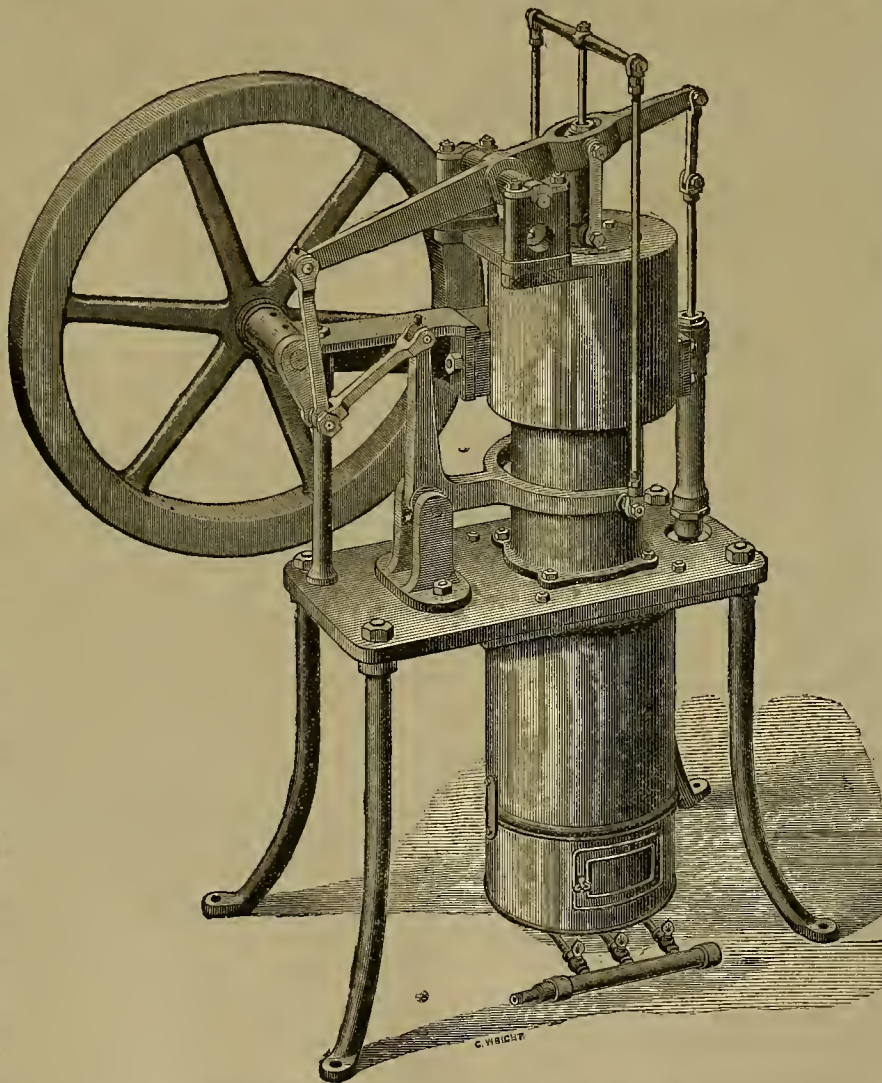
are done in a shop in large manufacturing establishments is noticed by the proprietors, and the individual doing them is recognized as perhaps above the common run, it is not always that any substantial recognition of his services is made.

It is pleasant to note that an English ship-building firm (Messrs. Wm. Denny & Bros., of the Leven Yard, Dumbarton), have set an example, which, if more frequently followed, will be to the benefit of both employer and employee, and will make a change in the existing customs. This firm has issued an intimation to their workmen, in which they state that having noticed during the past two years many improvements in the methods of work and appliances introduced by their workmen into their yard, they readily recognize the advantage accruing to their business from these efforts of skill, and are desirous that they should not pass unrewarded. Messrs. Denny have, therefore, decided that the authors of improvements introduced after this date shall have a claim upon the firm for reward; and to enable those claims to be readily and easily adjusted, they have appointed a committee of awards. The rewards are to be given to anyone who has either invented or introduced a new machine or hand-tool into the yard; to anyone who applies existing machinery or hand-tools to a new class of work; to anyone who has discovered or introduced any new method of carrying on or arranging work; or generally to anyone who has made any change by which the work of the yard is rendered either superior in quality or more economical in cost. The awards are not to be less than £2, and not more than £10, but the firm may grant a larger sum if satisfied that the invention is of sufficient importance to warrant them to do so.

It is sincerely to be hoped that this example will be followed everywhere. There is no expense entailed upon the proprietors unless they get an adequate benefit. The workmen receive no extra pay unless they deserve it. It will arouse a spirit of emulation among the men, which can only be full of good to themselves and their employers. We have heard of no better move for a long time. Indeed, we know of nothing at all comparable to it for improving the artisan and rendering his services of higher value to his employer. Besides enlarging the knowledge of the workmen, the research and study and thought will prove a wholesome and valuable discipline. It is a splendid example, and as we have already said, we hope it will be generally followed.

A CENSUS OF THE INDIANS.—A Washington dispatch of Sept. 15th says the work of taking the census of the Indian population of the United States will commence on the 1st of October. It has been placed under the direction of Major J. W. Powell, who will be assisted by Col. Mallory, R. L. Packard, H. W. Henshaw, H. D. Hinman and Clay Macauley. The country has been subdivided into four divisions, and a special agent to superintend the work has been assigned to each division. The work of enumeration will be slow, and it is estimated that at least six months will be required for its completion.

THERE were 180 horses in the Seaham mine at the time of the explosion.



ERICKSON'S NEW CALORIC PUMPING ENGINE

pieces of rich quartz taken out of the Rocky Bar mine the other day, there was one that not only had gold running through it, but one side looked as if it had been gold-plated. The surface was covered with a film of bright gold, the result, undoubtedly, of immense pressure. The fine specimen weighed 117½ ounces troy, contains 49 ounces of gold, and is valued \$830. The Union says this is the richest piece yet produced from the late find in the Rocky Bar.

MECHANICS' FAIR PREMIUMS.—We expected to have the pleasure of announcing this week the award of premiums for exhibits at the Mechanics' fair, which closed on Saturday evening of last week. The committees have duly reported, but the reports have yet to be combined and the result submitted to the managers of the Institute for their approval. For this reason we are unable to announce the awards in this issue of the PRESS.

of light on selenium to the Royal Institute of Great Britain in May, 1878; and shortly afterwards he heard Willoughby Smith announce to the Society of Telegraphic Engineers that he had heard the action of a ray of light on a crystal of selenium by a telephone in connection with it. Prof. Bell was born in Scotland, and was educated at the University of Edinburgh. He arrived in Canada in 1870, and was called to a chair in Boston University in 1872. He is said to be a man of remarkably fine presence.

THE Tioga mining district is in Mariposa county, on the head waters of the Tuolumne river, near the line dividing Mariposa and Mono counties, and about 30 miles easterly of Yosemite valley. It contains many promising silver mines.

STANLEY has stated to a Portuguese captain that the object of his expedition up the Congo is to open a path for traders.



CORRESPONDENCE.

Wadmit, unendorsed, opinions of correspondents.—Eds

Mines of Owyhee County, Idaho.

[Special Correspondence of the MINING AND SCIENTIFIC PRESS.]

EDITORS PRESS:—This district has not been so dull for a long time, but several new and important developments, together with a renewal of confidence on the part of outside capitalists, especially in the New England States, leads us to look for better things in the immediate future. The situation is such that a general review will not be out of place at the present time.

Readers of the PRESS have been kept informed of the march of events here, and are doubtless familiar with the

History of this Camp;

Its discovery in 1863; the intense excitement and rush in consequence of the wonderful finds then made; the organization of local quartz mining companies; the extraction of enormous profits in brief periods; the richness of the surface ores, both of gold and silver; the sale of the leading mines, and, as the usual corollary, of a host of mere prospects to San Francisco capitalists; the listing on the San Francisco Stock Exchange of the stock of these properties, good, indifferent and wild-cat alike, at enormous capitalization; the subsequent fever of speculation in Owyhee mining stocks, fed by the sparse but carefully-planned dividends at the beginning of their career; the erection of extravagantly top-heavy hoisting works on a great number of claims; the

Mismanagement

And defalcation of the principal manipulator in 1875; the mending and heavy assessments paid by a long-suffering public; and the final collapse of the whole stock-gambling edifice. This sums up our history from the discovery of the mines through the flush period and epoch of decline. Since then, Owyhee is considered to have been recovering but slowly from the black-eye thus inflicted, but there are now symptoms of a favorable change in public sentiment, to which, I fear, San Francisco people may be an exception, having in view their past unlucky experience and dreading to again approach the fire which has once singed them (cinched, I believe, would be the more appropriate phrase). However, Eastern capitalists, not having this disagreeable impression ever on their minds, have invested largely here, and will not suffer. The last four years have been an era of

Enforced Economy.

What work has been done has been more carefully supervised, more economical in character and more profitable in results. This change is a healthful sign for the future, but I must say is little relished by many of the old residents, who look back longingly to the flush times when money circulated so freely and carelessly in the camp and fortunes could be made in a few months; but, alas, were never kept. Apart from early extravagance, our people suffered, too, in the general downfall, having had enduring faith in the times, but being innocent as lambs of the intricacies of stock speculation. The result was that nearly all suffered heavily, and on the suspension of the Bank of California not a few here followed suit in sympathy. We have few rich men here now, but many who think they are well on the way toward a fortune, and certainly a considerable proportion who will profit largely by their present mining interests.

Silver City.

The county seat, and the center of the mining industry, was once a flourishing town of from 3,500 to 4,000 inhabitants. It has fallen off to only 800 at present. The neighboring camp of Fairview in 1870 boasted 2,500 inhabitants. Probably 100 would include all that hurg could, with any decency, lay claim to now.

The altitude of Silver City is 6,500 ft. above sea level, and that of the overlooking War Eagle and Florida mountains is 8,000 ft. Silver City has a mild and pleasant climate in summer, but in the winter months the snows are heavy, interrupting communication, and the winds are sometimes high. As might be expected at this altitude, the mercury sometimes gets tired and settles down into its more comfortable bunk in the bulb; but you cannot expect everything in one mining camp. Nature has put the mines in the high places, perhaps so as not to interfere with the agricultural interests; and consequently miners have to live well up in the skies. Silver City is on the stage road between Boise City, Ada county, the capital of the Territory, and Winnemucca, Nev., on the Central Pacific railroad. It is distant 60 miles from the former, and 210 miles from the latter. Teamsters and freight companies used to make a good thing out of hauling from the railroad, from which all our supplies are derived; but they get now only three to five cents per lb., which is quite a reduction, and only haul in the summer months. The time occupied in hauling ranges from two to three weeks.

There are five

Principal Districts

In this county—War Eagle Mountain (or Fairview), Florida Mountain, Wagontown, South Mountain and Flint. On War Eagle Mountain

the principal mines are the Golden Chariot (including the old Minnesota), the Mahogany, Ida Ellmore, South Chariot, Oro Fino, Poorman, War Eagle, Empire, North Empire, South Empire, Illinois Central, Glenbrook, Owyhee, Idlewild, Silver Cord, Red Jacket, Whisky Gulch and Ruth. Of these the Poorman was the most productive, turning out about \$3,000,000 (most of it before being given to the dear public in the shape of stock certificates); the Oro Fino, credited with nearly \$2,000,000; and the Golden Chariot, which produced about the same amount. Many of the other mines have produced over \$100,000. Would that they were doing so now! Nearly all of the mines on

War Eagle Mountain

Have expensive steam hoisting works; the three last mentioned being splendidly equipped, while the War Eagle, Illinois Central, South Chariot, Empire, Owyhee and others are not far behind. The general depth of these mines is from 800 ft. to 1,050 ft. Their best ore was found in the upper levels, but at the time of closing down much good ore was still in sight at the bottom. They are wet mines, and many of them which have not been recently worked are full of water nearly up to their shaft mouth. The War Eagle and Empire have raised a great deal this season in prosecuting explorations below.

The country rock of War Eagle Mountain is granite, forming both walls. The ledges are well defined. They are narrow, but this has been more than compensated for by the richness of the ore. The latter is found generally in pay chutes or chimneys, and in especially rich pockets. Little of the ledge filling has been absolutely barren, it being simply a question of milling and other expenses, as to what would pay for extraction. In some of the mines there is on one wall or both a regular clay gongee.

The Ore

Is a free milling and easily crushed quartz, carrying silver sulphurets, and, especially near the surface, a large proportion of gold. In fact many of the mines could rather be called gold mines than silver ones, if we are to judge by the relative preponderance of the two precious metals. Of this latter character was the Morning Star in its palmy days. I have seen recently many beautiful specimens of surface ores and float in which the gold runs up in the thousands per ton. The cayoite miners and chloriders (you see we have borrowed the old White Pine expression) make a good thing by scratching around on old dumps and in the drifts and stopes of abandoned mines, picking out the rich rock and sorting and sacking it. Several small lots this season were pounded out in band mortars or treated in arastras which produced at the rate of \$1,000 to \$2,000 per ton.

The Crash.

Most of the mines sold under the Sheriff's hammer after the crash, and their works were bought in at absurdly small prices. You could buy a magnificent rig then for \$2,500, which might have cost over \$100,000. The Golden Chariot was one of the few incorporations which managed to hold its property. Stock in most of the others is valuable only as a curiosity now, the mines belonging to others than the companies. I don't know whether all San Francisco holders are aware of this, or are still cherishing their certificates in the hope of another boom in the market; but if they will come up here they will see cords of stock plastered up on the walls of sarcastic former owners, and a good deal in the specimen cabinets for which the town is famous. The Owyhee and War Eagle are being operated by a

Boston Company

Of which Supt. Parks is the representative here. The latter mine turned out over \$100,000 last year. Messrs. Crutcher, Thomas and others are working the old Empire, with good prospects. Martin & Simundi made a good thing, it is said, out of Glenbrook this year. Many of the smaller mines have yielded well. It is a pity that the Golden Chariot, Poorman, Oro Fino and others could not be started up. The cost of running the expensive machinery is a bar to the present owners. Only a company willing to put in some capital could succeed, and for such there are a dozen fine openings at existing prices.

Florida Mountain.

The mines of Florida mountain, opposite War Eagle, on the other side of Jordan (creek), are of comparatively recent discovery, and have been worked only for three years. Last year Gen. John B. Winters, formerly superintendent of the Yellow Jacket, on the Comstock, took out of Black Jack some \$80,000 or \$100,000. The Florida Hill, Sands, Owyhee Treasury, and others, have also made a record. The formation of Florida mountain is altogether different from that of War Eagle mountain, being porphyry throughout. The ore, however, is similar—a free milling silver ore carrying a considerable proportion of gold. The veins here are also plainly marked, and it is a simple matter to follow them. The mines on Florida mountain are worked by tunnels, which the steepness of the mountain side makes possible, and none of them are yet down to any great depth. Miners here have a great idea of the permanence of depth of quartz ledges which are in a porphyry country rock, and would like to see these Florida mountain mines opened at, say, 1,000 ft. or so. For that depth shafts would be necessary.

Wagontown District

Is also comparatively new, but promises well. The country rock here is porphyry, also, and the veins, some of which are big ones, carry a variety of ores. Messrs. Jones & Adams have

applied for a patent on their Wehfoot mines. The old Henrietta has been consolidated with adjoining claims, and is now being worked by the Tremont mining company, of Boston, Mass., with Mr. Tregloan as superintendent. This company is building a 10-stamp dry crushing and roasting mill on Jordan creek, about a mile from the mine. Frank Hunt had a crushing of 100 tons this summer at the Lincoln mill, Silver City, from the Last Chance. Other notable mines in this district are the Stoddard, owned by T. Regan, the Crown Prince and Bismarck ledges, owned by Wm. F. Sommercamp, the Ohio, Zulu, Monarch, Maggie, etc. Wagontown is 10 miles south of Silver City, and the town itself is about a couple of miles from the mines. The stage road runs through it.

South Mountain and Flint

Districts went to pieces during the general smash, but considerable attention is being paid them now. South Mountain is 25 miles south of Silver City, and Flint is distant 12 miles. The ores of both are base, requiring smelting or leaching. The South Mountain Con. mining company, which once figured on the San Francisco stock list, had a large number of mines, and had just started in to work them, with good prospects, when it too was forced to suspend operations. There are a number of

Quartz Mills

And arastras about Silver City, among which may be mentioned the Golden Chariot, Lincoln, Cosmos, Leonard, South Chariot, Trask's and Wagner's. At Wagontown Messrs. Jones & Adams have a 10-stamp mill. Most of these mills are extensively built and have a fine equipment; the Golden Chariot, which has been idle for a long time, especially. Mr. McGregor has been running the Lincoln 20-stamp mill this summer on ore from the Glenbrook, Black Jack, Ruth, Last Chance and other mines. The mill does good work.

Within a few days some rich rock has been struck in the Whisky Gulch, Addie Leonard and adjoining claims north of Silver City. The only other important piece of news for this letter is the erection of a new mill at South Mountain by Tracy & Jones. They have concentrated on the way from San Francisco. With this start South Mountain is looking up once more.

PAUL WARD.

Silver City, Idaho, August 26, 1880.

A Rich Auriferous Belt.

The strike of remarkable rich gold-bearing quartz in the Rocky Bar mine, last week, serves to verify a fact well known to all the old miners of the district of the extent and value of the system of ledges extending along the west bank of Wolf creek, from Gold Hill to the Allison Ranch, a distance embracing about two and a half miles. From time to time, since the discovery of gold-bearing quartz on Gold Hill in 1850, this belt has produced an enormous amount of gold—an amount that can be counted by millions—a handsome percentage of which was found in just such rich stratifications of which the Rocky Bar now gives an example. All the early miners will recollect the rich specimens, frequently more than half gold, which came from Gold Hill, or the remarkably rich quartz which came from Massachusetts Hill, the old Rocky Bar, New York Hill, the French Lead and Allison Ranch, that made them famous in their day of active working. These mines are all on the same system of veins, that lie close together, and in some instances are on the same vein and are adjoining locations. The Gold Hill was the first quartz location ever made in California, so far as is known to history, and was made in October, 1850. The finding of gold in the quartz created a great excitement among the placer miners, but it was not until the following year that a crude mill was erected for reducing the quartz and extracting the gold. Work was continued upon this location with more or less activity until 1865, during which time it was estimated that not less than \$1,000,000 was produced. The Massachusetts Hill claim was located a short time subsequent to the Gold Hill, but its great riches were not struck until several years later—about 1856. During the life of the mine, which lasted about eight years, over \$8,600,000 was extracted. Work was then suspended because the mine was worked to its limits, it being a square claim, as were all the early quartz locations. In the vicinity of Massachusetts Hill were the old Rocky Bar, Seaden Flat, Ford and Reilly, Stockbridge, and other locations, all of which have produced considerable bullion. None of these claims have been worked to any great depth; they are all held on the square location system; and a consolidation is necessary to their successful working.

South of Massachusetts Hill is the Black Lead, which has produced very rich quartz. The New York Hill is an early-day location, and up to 1865 had produced not less than half a million in gold. From that date it was permitted to lie idle for several years; but for the last five years it has been worked continuously, and is now paying dividends. The best quartz has been obtained from the 800 down to the 1000 level, and the opening of the 1100 level is giving equally good promise. This mine is now worked to a greater depth than has ever been reached by any of the mines along the range mentioned, and the results obtained are strong evidence of the utility of deep working. The new Rocky Bar, now turning out rock of extraordinary

richness, adjoins the New York Hill on the north, and the Ford & McDonald, noted for its constant richness, adjoins the Rocky Bar on the west. To the south of the New York Hill are the Wisconsin, Hartery, Homeward Bound, Lone Jack, Omaha, and several other locations, which have been worked more or less, all of which have been bullion producers, but none have been worked to great depth.

Southwest of the New York Hill is the French lead, which was worked for many years and produced millions, and still has a large body of unworked ground. Farther to the south, immediately on the west bank of Wolf creek, is the Allison Ranch mine. The ledge was discovered in 1854, and systematic work was commenced in the following year. A great deal of fabulously rich ore was abstracted, one crushing of 62 tons alone yielding \$23,000. This mine was worked until 1866, when the rich pay chute seemed to be worked out, although the vertical depth was only 340 ft. Up to that time the books of the company showed that the mine had produced over \$2,300,000. In the same vicinity were other claims that produced bullion to some extent, but we have not the data upon which to estimate their yield.

The above mention suffices to show that this quartz belt, extending from Gold Hill to Allison Ranch, a distance of two and a half miles, by about one-half mile in width, has been the most productive of any quartz region in the State, and for its extent probably the most productive district in the world. These limits do not comprise the extent of this auriferous belt, which can be found both further north and south, but embraces that portion which has proved rich in bullion production, and all lying on the west of Wolf creek, and has no reference to the Oshorn Hill range to the east, which has been prolific in gold, or the Eureka and Idaho vein, which is separate and distinct from the system of which we have been speaking. Many of the claims within the district referred to are idle, and have been so for years, and yet there is scarcely one of them whose real treasures have been developed, because none of the claims located on the dips and angles have been worked to more than superficial depth—the vertical depth of the deepest shaft on any of them not exceeding 400 ft.

It is not claiming too much for the Grass Valley district to say that, notwithstanding mineral discoveries elsewhere, it has proven one of the best and most reliable regions for mining ever discovered, paying better for the money invested than any other, and that it is yet in the very infancy of its gold production. Grass Valley Union.

Boiler Explosions by Mysterious Agencies.

The belief which for many years has been prevalent, that mysterious agencies within a boiler were often the causes of the most disastrous explosions, baffling coroners' inquests, generally resulting in a verdict so mysterious that nobody could understand it, or in throwing the blame entirely on Providence, is fast giving away before the light which is brought to bear by the investigations of practical men. Investigators, who have examined all kinds of boilers under the varying conditions of use, and who have made the subject of boiler explosions a careful study, are explaining the causes of these terrific accidents, and showing how they can be avoided. The causes of boiler explosions are now summed up under four heads, viz., bad material; faulty in type; bad work in construction and inefficiency and carelessness in management. Explosions may occur from any one of these causes, even if in other respects the boiler is sound. So the problem is reduced to its simplest form, and any purchaser or user of a steam boiler can understand what is required. The maker of poor iron would seek refuge under the mysterious agency theory, and so would the mechanical engineer who planned a boiler of faulty type, and the boiler maker whose work was unfit to withstand the load imposed upon it, would find abundant cause for congratulation in the mysterious agency theory. The engineer who must stand before his boiler day after day, year in and year out, would find very little satisfaction in contemplating, that no matter how vigilant he may be, there were agencies in his boiler, that without a moment's warning, may blow him out of existence. The only way to prevent these accidents or diminish their frequency, is to put the responsibility where it belongs. First, upon the manufacturer of the iron; then upon the boiler designer and maker, and lastly upon the boiler owner and user, and the engineer whom he employs. There is no place for cheap, ignorant and careless help here. Nor is there any excuse for the penurious manufacturer, who disregards the advice of his engineer in regard to repairs, until from sheer weakness and inability to hold out longer, the boiler "lets go" and brings consequent destruction and woe. Mr. Robert Wilson in his "Treatise on Steam Boilers," says: "The practice of ascribing steam boiler explosions to obscure causes has been productive of much mischief, as it engenders a carelessness on the part of owners and attendants, who have been led to believe that no amount of care will avail against the mysterious agents at work within the boiler."—The Locomotive.

THE Candelaria mill and mining company filed articles of incorporation. Capital stock, \$10,000,000. Directors—Geo. S. Montgomery, John L. Creighton, Herbert Fountain, Dennie Cullinan and Michael Driscoll.

MECHANICAL PROGRESS.

High-Speed Machinery.

This is a fast age in which we live, but we do not always realize that speed is power. In fact not only power but fortunes. Most of the modern improvements possible to manufacturers are only those which serve to produce manufactured goods in a smaller space of time than before and consequently at a less cost. It is remarkable how little the value attaching to high speeds is watched by manufacturers. We would be prepared to undertake to prove that not more than 10% or 20% of the ordinary machines in an engineer's works are running at their proper speed for maximum production, and if engineers are thus negligent, what must the ordinary manufacturer be? Referring to this point of the proper speed for engineers' tools, it may be borne in mind that the speed of a cutting machine should be regulated by the number of feet per minute traveled over by the cutting face and the quality of the material cut. From 15 to 13 ft. per minute may be allowed for wrought or cast iron, and twice that speed for gun-metal, whilst for steel the speed must be reduced in proportion to its hardness. As a rule, these speeds are seldom approximated to, and it thus becomes a matter of serious loss to the engineering manufacturer that a certain cost of plant is not producing its full equivalent of work in a given time. In the same way, with reference to the prime movers or engines, their development of power is exactly proportionate to their speed; indicated horse power being the product of the gross pressure multiplied into the number of feet per minute, through which the resistance is overcome. Thus a manufacturer who requires increased driving power, may obtain it from his present engine by increasing the speed of the engine proportionately, provided he has sufficient boiler power. About 300 ft. piston-speed per minute is the average speed for which most commercial engines are designed. But they do not all run up to this speed, and it may easily be greatly exceeded if proper precautions are taken.

The two great difficulties to be met in an indefinite increase of speed in prime movers are, first, the shocks produced by rapid reciprocation, and the centrifugal force developed by any weight revolving rapidly round a center. The shocks may be so great as to cause vibrations sufficiently violent to break the frames of bearings, or to shake the motor or machine to pieces. The whole art of preventing these shocks of reciprocation is to receive the reciprocating parts on elastic gaseous cushions of air or steam, so as gradually to destroy the velocity of the reciprocating part before reversal. In high-speed engines this may be well effected by what is termed "cushioning" the exhaust steam. The exhaust part of the slide valve may be provided with such an amount of inside lap as will serve to close the exhaust port some time before the stroke is completed. The imprisoned exhaust steam serves not only to make an excellent elastic cushion to destroy the motion of the reciprocating parts, but also serves to fill the ports and clearance spaces, and thus to promote economical working. The highest speeds of reciprocation may be thus obtained with easy and noiseless working if the amount of cushioning be proportionately increased. Next, with regard to the centrifugal force developed by all material in rapid rotation around a fixed center; this may amount to a great deal—more than is generally anticipated. The centrifugal force so developed has frequently been sufficient to cause the destruction of fly-wheels, centrifugal machines, emery stones, and other high-speeded

machines. The formula $\frac{Wv^2}{2g}$,—in which W is

the weight of any revolving body, v is velocity in ft. per second, and g is gravity—shows that in a fly-wheel six ft. in diameter, and revolving at 1,000 revolutions per minute, each lb. weight, of about four cubic inches on the rim, exerts a radial centrifugal force outwards of nearly 40 tons—that is, more than sufficient to destroy the natural cohesion of cast iron. No massiveness or strength of material will in such cases add to the safety. When the centrifugal force exceeds the tensile strength per square inch, the material must fly to pieces, however massively it is made. But for these dangers and difficulties, the advantage of high speeds for economy in engines and factory plant cannot be too highly recommended. Friction does not increase with velocity. Rather otherwise; the proportion of frictional resistance is considered less for high velocities than for low. The proportion of power obtained from a given weight of material also increases directly with the velocity—that is to say, an engine of the ordinary trade 10-horse power becomes a 20-horse power engine by running at double the usual speed. All shafting may be decreased in diameter inversely as the cube-root of the number of revolutions increase; that is to say, a three-inch shaft may be reduced to 2.4 inches if the speed of revolution be doubled. In the same way the size of driving pulleys may be diminished, as the strain transmitted for a given power decreases exactly with the increase of speed, and the size or breadth of the belt may be also reduced in similar proportion. The whole cost of plant throughout a factory—engine, shafting, plunger blocks, pulleys and belt—may be all reduced in certain proportions to the higher proportion of speeds that may be used. This

in itself should make the practicability of speeds higher than those generally used a subject of careful consideration to all proprietors and engineers of factories or works, besides the certainty of a much greater proportion of work being turned out in a given time than could be the case with lower speeds on the machines.—*Iron.*

IRON IN ARCHITECTURE.—A paper on "Iron as a Material for Architectural Construction," has been read by Mr. James Allanson Picton, F. S. A., before the Institute of British Architects. The object of the paper was to trace out the use, progress and capabilities of iron as building material, and to inquire what influence these capabilities were likely to exercise on construction and design in the future. The author commented on the little mention made of its use for architectural purposes, and pointed out that it was likely to be used to a greater extent in the future in architectural construction and design. The author could not agree with Mr. Ruskin, that iron should be simply used for connecting stones together. The ultimate principle of all true architecture was to use materials within our reach in such a manner as would bring out their capabilities efficiently. The paper concluded by showing how, in a variety of ways, iron could be used, not only for the merely constructive portions of buildings, but for dome lights, galleries, entrance doorways, window balconies, etc. The engineer hitherto had enjoyed almost a monopoly of iron, but the architect, too, might put in his claim, as the material is plastic, and ready to take any form that genius and taste might suggest.

A SHOWER OF RAILROAD SPIKES.—The great demand for railroad spikes has called into existence a remarkable machine, now in successful operation at Pittsburgh. It is the invention of the late Mr. James Swett, and comprises a series of "continuous" rolls handling the material automatically. The iron, in the form of billets two and a half inches in diameter and three and a half ft. long, is taken in by the machine, and in 13 seconds reduced in diameter and increased in length to a rod 36 ft. long, and nine-sixteenths of an inch square. In 40 seconds more this rod is cut in two and is passed through two spike machines, from which finished spikes shower at the rate of 40 tons every ten working hours. By working "double time" five of these machines have turned out 1,100 kegs of railroad spikes per day, each keg containing 150 pounds, or 13 kegs to the ton. The product of ordinary rolls and machines is from two to two and a half tons of finished spikes per working day of ten hours.

AN INGENIOUS CUT-OFF ATTACHMENT has been devised for the steam cylinder of direct-acting engines—such as are principally employed for driving steam pumps, hammers, rock drills and similar machines—by the adoption of which the action is rendered much smoother. In this arrangement, the steam may be cut off at any point. In order to prevent the pressure of steam within the cylinder from being reduced too much below that of the steam chest—which might sometimes happen from too great expansion—small tension valves are employed; these are secured to the main valve opening into the ports, provided with springs, so that, when the difference in pressure exceeds a certain amount, the springs will yield, and allow steam from the chest to yield and enter the cylinder. By means of this cut-off, a softness is given to the stroke, making it without any noise or jerk whatsoever, and with the additional advantage of a considerable economy in steam.—*American Ship.*

HOLLOW GROUND RAZORS.—It is not long since it was confidently asserted that, even if the required quality of steel could be produced here, the United States could never compete with England in the manufacture of razors and other fine cutlery, owing to the excessive cost of grinding and finishing. Like a good many other "insuperable" obstacles to American success in the arts, this seems to have been pretty well overcome, since large quantities of Sheffield razor "blanks" are now sent here expressly to be finished. It seems that the art of "hollow grinding," German style, requires a degree of skill a little beyond that of the Sheffield workmen. Accordingly Sheffield manufacturers have to pay double freight across the Atlantic to secure the fine finish to their razors that the trade now demands.—*Scientific American.*

A DIFFICULT PIECE OF CASTING.—The Ames Co., Chicopee, Mass., have recently finished the most difficult piece of iron casting they have ever attempted. This is an iron tub for a rag engine, and was ordered by the Seymour Paper Co. of Windsor Locks, Conn. The job took eight and a half tons of metal, and the work preparing the mold occupied three weeks. The difficulty of the work consisted in the tub being so large and the sides and bottom so thin. Iron tubs for paper mills have been made before, but they have been cast in sections. They will be much better if they can be made in one piece, and when once in place will last as long as the mill does.

HARDENING GLUE.—The only thing that will render glue perfectly insoluble is bichromate of potash. If you add a little of this in solution to the glue, and after applying the glue to the article expose it to the sunlight, it will become insoluble even in hot water. Better expose for a good while, say an hour or so, to make sure that all the glue has become insoluble.—*Boston Journal of Commerce.*

SCIENTIFIC PROGRESS.

The Cause of Perpetual Snow.

Dr. James Croll, in the current number of the *American Journal of Science and Arts*, says the reason why snow at great elevations does not melt, but remains permanent, is owing to the fact that the heat received from the sun is thrown off into stellar space so rapidly by radiation and reflection that the sun fails to raise the temperature of the snow to the melting point; the snow evaporates, but it does not melt. The summits of the Himalayas, for example, must receive more than 10 times the amount of heat necessary to melt all the snow that falls on them, yet in spite of this the snow is not melted. Notwithstanding the strength of the sun and the dryness of the air at these altitudes, evaporation is insufficient to melt the snow. At low elevations, where the snowfall is probably greater, and the amount of heat received even less, the snow melts and disappears. This, Dr. Croll believes, must be attributed to the influence of aqueous vapor. At high elevations the air is dry and allows the heat radiated from the snow to pass into space, but at low elevations a very considerable amount of the heat radiated from the snow is absorbed by the aqueous vapor in the atmosphere. A considerable portion of the heat thus absorbed is radiated back on the snow, and, being of the same quality as that which the snow itself radiates, is for that reason absorbed by the latter. The consequence is that the heat thus absorbed accumulates in the snow till this is melted. Were the amount of aqueous vapor possessed by the atmosphere sufficiently diminished, perpetual snow would cover our globe down to the sea shore. In a like manner the dryness of the air will, in a great measure, account for the present accumulation of snow and ice on Greenland and on the Antarctic continent. These regions are completely covered with snow and ice, not because the quantity of snow falling on them is great, but because the quantity melted is small. And the reason why the snow does not melt is not because the amount of heat received during the year is not equal to the work of melting the ice, but mainly because of the dryness of the air, the snow is prevented from rising to the melting point. In places like Fuego and south Georgia, where the snowfall is considerable, perennial snow and ice are produced by diametrically opposite means, namely, by the sun's heat being cut off by clouds and dense fogs. In the first place, the upper surfaces of the clouds act as reflectors, throwing back the sun's rays into stellar space, and in the second place, of the heat which the clouds and fogs absorb, more than one-half is not radiated downward on the snow, but upward into space. And the comparatively small portion of heat which manages to reach the ground and be available in melting the snow is insufficient to clear off the winter's accumulation.

DISEASE ORGANISMS.—The organisms described by Pasteur as the origin of epidemics and contagious disease are so minute and few compared with the multiplying swarms of bacteria, etc., pervading all generating solutions, that it becomes necessary to provide a means of eliminating the masses of infusoria from solutions to be studied under the microscope. These microzoa haunt even the clearest drinking water at times, and it becomes highly important to easily determine their presence. M. Certe (Proceedings Acad. des Sciences) suggests the use of osmic acid as a sure means of killing them without destroying their tissues. He dips a glass rod into the solution to be examined and then into a 1% solution of the acid; washing this in a narrow test tube of distilled water, it is easy to collect what is necessary for examination. There are certain precautions to be taken as to cleanliness and time of immersion. By the use of a mixture of Paris violet in diluted glycerine, he finds it possible, by uniform difference of tint, to easily distinguish cellulose, amylaceous matter and the vibrating cilia.

TERRESTRIAL MAGNETISM.—Prof. Balfour Stewart, in a letter to *Nature*, July 1, 1880, discusses the connection between auroras and magnetic storms. Since we have changes produced in stationary strata by a moving magnet, cannot the reverse be true? May we not have discharges produced in moving strata by a stationary magnet? The sun in this case would by convection currents produce changes in the atmospheric strata, and the earth as a permanent magnet would cause electric disturbances, which in turn would react upon terrestrial magnetism. Working upon this hypothesis Balfour Stewart has been led to the fact "that certain magnetic diurnal changes lag behind corresponding solar changes, just as meteorological changes would do," and he also states that his observations up to the present appear to show that an increase or decrease of solar activity corresponds to an increase or decrease of both magnetic and meteorological activity. The probability of a progress of magnetic phenomena from west to east, corresponding in character to a progress of meteorological phenomena is alluded to. Magnetic weather appears to travel faster, however, than meteorological weather.

Expansion of Glass by Heat.

Select a straight glass tube 50 or 60 centimeters in length and 1 or 2 centimeters in diameter. Place it transversely in front of a fire, in a horizontal position, properly supported near its two ends on two horizontally-adjusted rods of hard, smooth wood of about the same diameter as the tube; the glass tube will gradually roll towards the fire. Now let the supporting rods be transferred to either side of the center of the tube, so as to support it near its middle; the tube will now gradually roll from the fire.

It is scarcely necessary to remind the reader that the greater dilatation of the glass on the side of the tube which is nearer the fire renders it curved, with the convexity next to the source of heat, so that, when supported near the ends, the falling of the central parts of the curved tube rolls it towards the fire; but when supported near the middle, the falling of the ends of the similarly curved tube rolls it from the fire. These experiments, it is evident, succeed better when the cold tube is first adjusted near the fire than when it has been so long exposed to the action of the heat as to have become heated throughout its mass.

It seems that about the year 1740 this behavior of glass tubes under similar conditions was noticed by Mr. C. Orme, of Ashby de la Zouch, while heating some thermometer tubes. The Rev. Granville Wheeler, who carefully verified the experiments of Mr. Orme, very correctly ascribes the phenomena to the distortion of the tube due to the action of heat (*vide Philadelphia Transcript*, No. 476). Nevertheless, in the United States this behavior of glass tubes, when placed before a fire, has been frequently classed among the unexplained mysteries of glass! As recently as 1865, Mr. Deming Jarvis, of Boston, in his little volume entitled "Reminiscences of Glass-Making," p. 10 (2d ed., N. Y., 1865), refers to the phenomena, but with not one word of explanation. In fact, not long ago some of our semi-scientific journals characterized these phenomena as mysterious and inexplicable. Hence I have for the last 20 or 30 years employed such experiments, not only as exhibiting visible manifestations of the expansion of glass, but also as affording an instructive and significant illustration of how completely the most obvious mechanical results may be overlooked or obscured under the inspiration of the propensity to seek for the marvelous in nature!—*John LeConte, in Nature, August 5th.*

Curious Physical Phenomena.

A curious physical phenomenon has, says *Nature*, been lately described by Dr. Grassi in the Proceedings of the Royal Institute of Lombardy. An apparatus is formed of three concentric vessels with an annular space of about two centimeters between the first and the second, and the second and the third. The outer space is filled with oil, and the next with water. The oil is heated by a gas furnace to a little over 100°, and the water boils. Then hot oil at, for example, 150° is poured into the central space. This quickly cools to a temperature close to 100°. Dr. Grassi found that the central oil cooled more rapidly the higher the temperature of the outer oil; and with more delicate apparatus (in which the vaporized water was conducted and returned, and the outer oil kept at any required constant temperature) he arrived at definite numerical results, which he tabulates. With the outer oil at a mean temperature of 129.9°, for instance, the time of cooling of the inner oil from 130° to 110° was 49"; when the former was 105.1°, the latter was 57". Alcohol and ether gave more decided results. The maximum difference was obtained with ether; the outer oil being at 57.5°, the inner took 25" to cool from 57° to 50° (7.); whereas the former being 39.3°, the latter became 39.5". In all the experiments the cooling of the inner oil commenced at a temperature little above the maximum of the external oil. When the outer oil is at a higher temperature, at a certain point the heat begins to prevail, which is transmitted directly from the outer to the inner oil. An analogous phenomenon (to which Dr. Grassi refers) was that of some members of the Accademia del Cimento, who found that the water in a vessel surrounded by ice cools more rapidly if the ice be heated to accelerate fusion.

ENCROACHMENTS OF GREAT RIVERS.—The extent of the encroachments of streams like the Mississippi and Missouri upon their banks can only be compared with what is taking place upon the southeastern shores of Great Britain by the action of marine currents. Indeed, owing to the direct manner in which American rivers impinge upon their banks in certain parts, the destructive action is, in their case, still more rapid. Several thriving towns on the banks of the two rivers specified have within the last few years been swept away by the erosion of their banks. Some time ago, certain ingenious engineering processes, by which such disasters had been prevented, were described in *Iron*. In the case of one doomed town, Covington, in Iowa, some of these appear to have been tried but to have utterly failed, owing to the swiftness and depth of the current. Covington stands on a bend of the Missouri, which, in two years has, in one part of the town, cut into the solid land for a distance of 33 yards. Failing to stop the river, the Covingtonians are removing back their houses on rollers; but it is doubtful whether the site of the town will not have to be changed.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Aug. 26	Week Ending Sept. 2	Week Ending Sept. 9	Week Ending Sept. 16
Alpha.....	81	63	61	61
Alta.....	2.40	2.40	1.65	1.10
Andes.....	2.60	1.90	1.95	1.60
Alps.....	70c	50c	50c	40c
Argenta.....	70c	50c	50c	40c
Atlantic.....	4.15	3.35	3	2.45
Baltimore Con.....	1.41	1.21	1.01	1.01
Belcher.....	1.41	1.21	1.01	1.01
Belmont.....	2.95	2.15	1.80	1.40
Bullion.....	1.15	1.15	1.15	1.15
Bechtel.....	1.15	1.15	1.15	1.15
Belle Isle.....	85c	75c	75c	60c
Bodie.....	1.40	1.40	1.40	1.40
Benton.....	1.40	1.40	1.40	1.40
Bulwer.....	3	2.60	2.15	2.35
Boyle.....	50c	40c	35c	30c
Black Hawk.....	50c	40c	35c	30c
Belvidere.....	20c	15c	10c	5c
Booker.....	85c	60c	55c	40c
Caledonia.....	2.60	2.35	2.15	1.95
Challenge.....	1.80	1.35	1.35	1.35
Chollar.....	3.75	3.75	3.75	3.75
Confidence.....	74	64	54	54
Con Imperial.....	55c	45c	35c	40c
Con Virginia.....	4.30	3.40	3.10	3.05
Crown Point.....	3.40	2.60	2.60	2.10
Con Washoe.....	40c	30c	40c	35c
Champion.....	40c	30c	40c	35c
Concordia.....	25c	35c	30c	1.40
Dayton.....	25c	15c	25c	20c
DeFries.....	25c	15c	25c	20c
Danby.....	40c	35c	35c	30c
Eureka Con.....	1.71	1.61	1.61	1.61
Excelsior.....	2.85	2.35	2.30	2.35
Extermination.....	2.85	2.35	2.30	2.35
Gen Thomas.....	2	1.30	2.1	1.95
Grand Prize.....	2	1.30	2.1	1.95
Gila.....	11	95c	1.20	1.05
Golden Chalk.....	11	95c	1.20	1.05
Golden Terra.....	11	95c	1.20	1.05
Goodshaw.....	63	4.90	5.4	4.90
Gould & Curry.....	63	4.90	5.4	4.90
Hale & Norcross.....	63	4.90	5.4	4.90
Hillside.....	25c	15c	25c	20c
Highbridge.....	25c	15c	25c	20c
Homestead.....	25c	15c	25c	20c
Hussey.....	25c	15c	25c	20c
Independence.....	35c	70c	65c	40c
Julia.....	1.45	1.15	70c	1.45
Justice.....	1.45	1.15	70c	1.45
Jackson.....	1	1	1	95c
Joe Scates.....	3	2.1	2.1	2
K. K. Con.....	10c	10c	10c	10c
Kentuck.....	10c	10c	10c	10c
Kosuth.....	10c	10c	10c	10c
Lady Wash.....	30c	35c	30c	40c
Leopard.....	20c	10c	10c	10c
Leviathan.....	20c	10c	10c	10c
Loa.....	5c	10c	10c	10c
May Belle.....	5c	10c	10c	10c
Manhattan.....	1	1	1	1
Martin White.....	35c	70c	65c	40c
McClintock.....	35c	70c	65c	40c
Meadow Valley.....	15c	13c	11c	13c
Mexican.....	15c	13c	11c	13c
Mides.....	15c	13c	11c	13c
Morning Star.....	15c	13c	11c	13c
North Con Virginia.....	25c	35c	30c	30c
New York.....	12c	11c	13c	13c
Northern Belle.....	12c	11c	13c	13c
Nova.....	50c	45c	40c	55c
Nevado.....	1.40	1.35	1.10	1.20
Ophir.....	10c	9c	8c	10c
Oriental.....	2.20	1.35	1.40	1.30
Overtman.....	2.20	1.35	1.40	1.30
Panther.....	2.20	1.35	1.40	1.30
Phenix.....	2.20	1.35	1.40	1.30
Phil Sheridan.....	40c	30c	25c	25c
Potosi.....	3.35	2.70	2.80	2.80
Prospect.....	15c	15c	15c	15c
Raymond & Ely.....	15c	15c	15c	15c
Rock Island.....	15c	15c	15c	15c
Rye Patch.....	15c	15c	15c	15c
Rough & Ready.....	4.30	3.1	2.55	3.05
Sage.....	11	10	10	9
Seg Belcher.....	19	15c	12c	13c
Sierra Nevada.....	19	15c	12c	13c
Silver Hill.....	75	85	75	85
Silver King.....	75	85	75	85
Silver Prize.....	75	85	75	85
Sucon.....	75	85	75	85
Summit.....	75	85	75	85
Scorpion.....	75	85	75	85
Solid Silver.....	75	85	75	85
South Standard.....	75	85	75	85
Star.....	75	85	75	85
St. Louis.....	75	85	75	85
Syndicate.....	75	85	75	85
Tioga Con.....	14	1	85c	1
Tripoli.....	20c	15c	15c	15c
Trojan.....	20c	15c	15c	15c
Union Con.....	30	25c	25c	25c
Utah.....	13c	11c	10c	11c
Vermont Con.....	10c	10c	10c	10c
Ward.....	10c	10c	10c	10c
Wells Fargo.....	10c	10c	10c	10c
Woodville.....	10c	10c	10c	10c
White Cloud.....	10c	10c	10c	10c
Yellow Jacket.....	9	7c	6c	6c

Sales at S. F. Stock Exchange.

Thursday A.M., Sept. 16.	500	Albion.....	85c	20c
3545 Alta.....	2.65	160	Belle Isle.....	25c
100 Andes.....	1.15	130	Black Hawk.....	25c
1585 Benton.....	1.55	140	Booker.....	20c
500 Baltimore Con.....	45c	415	Belvidere.....	45c
10 B & Belcher.....	1.95	11	Bulwer.....	15c
100 Belcher.....	2.15	165	Bullion.....	15c
325 Bullion.....	1.10	30	Bechtel.....	70c
380 California.....	2.40	2.35	Belmont.....	35c
220 Con Virginia.....	3.20	2.35	Champion.....	25c
100 Con Imperial.....	1.95	40	Columbus.....	2.65
100 Chollar.....	3	100	Caledonia (B H).....	2
50 Crown Point.....	2.01	350	Day.....	2.65
140 Caledonia.....	40c	100	D Standard.....	50c
950 C Dorado.....	85c	245	E M White.....	10c
170 Exchequer.....	2.35	15	Eureka Co.....	10c
50 Golden Gate.....	3.03	500	Grand Prize.....	25c
270 Gould & Curry.....	5.4	1400	Goodshaw.....	90c
315 Hale & Nor.....	1.95	600	Jupiter.....	40c
1115 Justice.....	40c	350	Mammoth.....	50c
225 Julia.....	1.10	10	Mono.....	2.1
850 Lady Wash.....	40c	120	Mono.....	2.1
930 Mexican.....	1.12	120	Mt Potosi.....	25c
50 N Bonanza.....	2.80	50	Marathon.....	11c
770 Ophir.....	1.10	150	Northern Belle.....	12c
150 Overman.....	1.10	150	N Belle Is.....	45c
175 Old Gold Hill.....	2.55	1120	N Nevada.....	1.80
110 Potosi.....	2.80	50	N Nevada.....	1.80
120 Savage.....	2.80	50	N Nevada.....	1.80
165 Sierra Nevada.....	1.11	200	0 Standard.....	1.70
930 Silver Hill.....	80c	750	Syndicate.....	70c
250 Scorpion.....	2.05	50	Star.....	25c
40 Solid Silver.....	1.00	150	S Bulwer.....	55c
300 Senator.....	1.00	150	S Bulwer.....	55c
150 Utah.....	1.00	150	S Bulwer.....	55c
130 Union.....	2.31	231	S Bulwer.....	55c
40 Yellow Jacket.....	6c	50	Tipton.....	55c
			Tioga.....	35c
			Utah.....	90c
			Wales.....	75c

AFTERNOON SESSION.
300 Addenda.....50c

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	18	50 Aug 2	Sept 29	Oct 18	W H Watson	302 Montgomery st
Addenda G & S M Co	California	4	20 Aug 10	Sept 13	Oct 1	T H Dixon	238 Montgomery st
Belcher S M Co	Nevada	21	75 Aug 25	Sept 27	Oct 20	Jno Crockett	327 Pine st
Bechtel Con M Co	California	6	25 Aug 11	Sept 17	Oct 7	J P Lundy	327 Pine st
Booker Con M Co	California	6	15 Aug 10	Sept 16	Oct 6	W H Lent	309 Montgomery st
Bullion M Co	Nevada	16	10 Aug 16	Oct 4	Oct 28	J W Frazell	328 Montgomery st
Caledonia S M Co	Nevada	32	25 Sept 14	Oct 20	Nov 10	R Wegener	414 California st
Champion M Co	California	7	25 July 31	Sept 6	Sept 27	Jno Crockett	327 Pine st
Con Pacific M Co	California	2	50 Aug 6	Sept 6	Sept 30	F H Lundy	327 Pine st
Equitable T & M Co	Utah	23	10 Aug 3	Sept 6	Sept 30	Chas J Collins	227 Montgomery st
Godfrey Gravel M Co	California	5	05 Sept 4	Oct 11	Oct 30	J M Buffington	309 Montgomery st
Gould & Curry S M Co	Nevada	38	50 Aug 5	Sept 9	Sept 30	A K Durhuoy	309 Montgomery st
Quinn M Co	Nevada	65	10 Aug 2	Sept 6	Sept 28	J P Lundy	309 Montgomery st
Gould & Norcross S M Co	Nevada	13	40 Aug 30	Oct 4	Oct 25	H & Charles	419 California st
Julia Con M Co	California	10	40 Aug 27	Sept 29	Oct 22	E C Masten	309 Montgomery st
Jupiter M Co	Nevada	33	50 Sept 13	Oct 18	Nov 8	R F Kelly	419 California st
Justice M Co	Nevada	11	15 July 21	Aug 27	Sept 21	F A Praisus	330 Pine st
Leviathan M Co	Nevada	15	Aug 6	Sept 27	Sept 27	J M Buffington	309 Montgomery st
Mackay G & S M Co	Nevada	4	50 Sept 4	Oct 24	Nov 18	J J Seville	309 Montgomery st
Martin White M Co	California	2	25 Aug 10	Sept 15	Oct 4	E P Farnsworth	202 Sansome st
Maybelle Con G & S M Co	California	5	10 Aug 7	Sept 14	Oct 4	Wm J Taylor	310 Pine st
McCracken Con M Co	Arizona	5	40 June 26	Aug 4	Sept 20	H Womburger	309 Montgomery st
Metallum M Co	Nevada	37	100 Aug 25	Oct 2	Oct 5	C L McCoy	309 Montgomery st
Ophir S M Co	Nevada	7	10 Aug 21	Sept 28	Oct 16	H P Bush	431 California st
Queen Bee M Co	California	7	10 Aug 9	Sept 14	Oct 5	G W Fisher	324 Pine st
Quinn M Co	Nevada	25	Aug 4	Sept 24	Oct 19	W M Gillette	309 Montgomery st
Red Cloud Con M Co	California	8	25 Aug 17	Sept 23	Oct 18	Wm J Taylor	310 Pine st
Scorpion S M Co	California	8	10 July 19	Aug 26	Sept 23	Geo R Spinnery	310 Pine st
Segregated Belcher M Co	Nevada	17	100 July 31	Sept 3	Sept 24	Geo D Edwards	414 California st
Sierra Nevada S M Co	Nevada	65	200 Aug 25	Sept 23	Oct 13	E L Parker	309 Montgomery st
Summit G M Co	Cal	6	25 Aug 12	Sept 11	Oct 1	W H Lent	309 Montgomery st
Telfair M Co	Arizona	4	02 Aug 20	Oct 2	Oct 23	J Pentecost	702 Market st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Amador Canal & M Co	California	3	100 Aug 13	Sept 21	Nov 2
Bismark M Co	Nevada	2	02 Aug 17	Sept 20	Oct 11
Eintracht Gravel M Co	California	5	100 Aug 24	Oct 1	Oct 11
Excelsior Gravel M Co	California	12	10 Aug 12	Sept 27	Oct 1
Equator M Co	Nevada	3	25 Sept 2	Oct 7	Oct 23
Gopher Con M Co	Dakota	1	100 Aug 11	Sept 16	Oct 12
Headlight M Co	California	3	10 Aug 17	Sept 20	Oct 12
Iowa M Co	Nevada	10	05 Aug 4	Sept 24	Oct 12
Mayflower Gravel M Co	California	8	10 Aug 26	Sept 30	Oct 19
McElroy G M Co	California	8	13 Sept 2	Oct 5	Oct 25
Peck M Co	Arizona	2	100 July 21	Aug 13	Sept 27
Quartz Mountain G M Co	California	8	100 July 30	Sept 6	Sept 20
Rough & Ready Con G M Co	Cal	2	05 July 28	Sept 8	Sept 23
Silveropolis G & S M Co	California	1	02 Aug 12	Oct 1	Nov 1
Utah S M Co	Nevada	31	200 Aug 11	Sept 13	Oct 1
Yellow Jacket Con G M Co	California	1	20 Sept 1	Oct 2	Oct 23

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Altoona Quicksilver M Co	California	C Allenberg	630 Brannan st	Annual	Sept 25
Belle Isle M Co	California	E C Masten	327 Pine st	Annual	Sept 23
Dudley M Co	California	E C Masten	309 Montgomery st	Annual	Sept 13
El Dorado W & D G M Co	Cal	R M Welch	524 Sacramento st	Annual	Sept 25
Flower M Co	Nevada	W W Weston	309 Montgomery st	Annual	Sept 25
Grand Prize M Co	Nevada	E M Hall	327 Pine st	Annual	Sept 21
Harper M Co	California	E C Masten	309 Montgomery st	Annual	Sept 20
Mt Potosi Con M Co	Nevada	E A Holmes	318 Pine st	Annual	Sept 22
North Bonanza M & M Co	Nev	W W Weston	309 Montgomery st	Annual	Sept 21
Northern Belle M & M Co	Nevada	Wm Willis	309 Montgomery st	Annual	Sept 13
Paradise Valley M Co	Nev	Wm Latta Oliver	325 Montgomery st	Annual	Sept 24
Spaulding G & S M Co	Cal	John Helt	117 Battery st	Annual	Oct 1
Tellurium G & S M Co	Cal	J M Hitchfield	415 Montgomery st	Annual	Sept 30

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Consolidated Virginia M C	Nevada	A W Havens	309 Montgomery st	50	Aug 16
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Sept 15
Father De Smet Con M Co	Black Hills	Theo Widmann	404 Montgomery st	50	June 30
Gen Thomas M Co	Cal	M Hall	327 Pine st	50	Sept 8
Napa Con Quicksilver M Co	California	J W Parrish	330 Pine st	10	Sept 1
New York Hill M Co	California	J B Leighton	527 Clay st	25	Sept 25
Northern Belle M & M Co	Nev	Wm Willis	309 Montgomery st	50	Sept 15
Northern Belle M & M Co	Nev	Wm Willis	309 Montgomery st	50	Sept 15
Northern Belle M & M Co	California	Wm Willis	309 Montgomery st	75	Sept 23

NORTH.—The South Hite company has made arrangements for the sale of a mill this fall.

ROCKY MOUNTAIN.—Hereafter all communication with the Crautery and Ferguson mines has been by the way of Coulterville and Sonora, but hereafter it will be by the way of Mariposa and Hite's Cove, a much shorter and more practicable route.

MONO.

BODIE DISTRICT.—Free Press, Sept. 9: There has been no developments in Bodie for some time. Since the Jupiter cut its rich body of ore on the 600 level, the company has not admitted visitors to the mine.

STANDARD CO.—Extracted and shipped to mill 1,135 tons of ore from the Bodie bar mine, and it seems that the shaft sunk 7 ft; total, 933 ft. The usual extension of work at all points has been made, and no change in character of ore or formation has been noted.

UNIVERSITY.—On the 605 level east crosscut extended to 33 ft; no change. West crosscut 38 ft, and nothing new in the 600 level south drift extended in total 313 ft and no change.

ROCKY MOUNTAIN.—Main shaft sunk 7 ft below the 600 level, where a station is being cut and drift started south, topping on the 550 and other levels progressing as last report, and Syndicate mill running.

BODIE CO.—Raising ore from the 200 level and sinking ledge to connect with level with the 300 level, is about all that is doing, aside from extending drifts on the 300 level and east crosscut.

ROCKY MOUNTAIN.—Main shaft sunk 7 ft below the 600 level, where a station is being cut and drift started south, topping on the 550 and other levels progressing as last report, and Syndicate mill running.

BODIE CO.—Raising ore from the 200 level and sinking ledge to connect with level with the 300 level, is about all that is doing, aside from extending drifts on the 300 level and east crosscut.

ROCKY MOUNTAIN.—Main shaft sunk 7 ft below the 600 level, where a station is being cut and drift started south, topping on the 550 and other levels progressing as last report, and Syndicate mill running.

BODIE CO.—Raising ore from the 200 level and sinking ledge to connect with level with the 300 level, is about all that is doing, aside from extending drifts on the 300 level and east crosscut.

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however, and is going to push the main tunnel ahead 500 ft further in the hopes of striking the channel.

PLUMBER.—The new 8-stamp crushing mill at Plumbago has been in running order for a couple of weeks. Several crushings have been made, all of which gave the most flattering results. The ledge varies from 2 to 4 ft in width. Only 5 men are at work now in the mine, but this force will be increased in a short time.

FLUORIDE PLAT.—The East ledge and Sears Union mining companies have closed up handsomely for the season. The last mentioned are through "for good," their ground being about worked out. The Bonanza, Virginia and California companies are working about as usual. It is reported that the last named companies have been bonded for handsome sums.

FLUORIDE PLAT.—Doubleday's *Mountain Messenger*, Sept. 11: Last week we visited the Forest quartz ledge, about a quarter of a mile from town. The property was worked years ago, but the owner became involved and the mine was closed. Since work has been resumed a very rich chimney 3 ft wide has been cut in the new tunnel. The quartz is full of gold, which can be easily seen by the naked eye, and yields \$1,000 per ton. This mine is owned by the Forest Co., of San Francisco. The company contemplates putting up a mill this fall.

NOTE.—Messrs. Hubbard & Darling brought to town, last week, some very nice specimens from their claim at the head of Floward creek. They have splendid diggings.

TRINITY.

BUCKEYE CO.'S DITCH.—Weaverville *Journal*, Sept. 11: We were informed by Mr. Helph, foreman of the work, that the Buckeye Co.'s ditch to Stuart Fork was completed on the 6th of the present month, and water turned in at the head on the 8th. It is expected that this will reach Owen's creek in a few days and connect with the water of that stream, which has been in the ditch for about 6 weeks. The entire length of ditch is in splendid condition, having recently been cleaned, timbered and thoroughly overhauled. The pipe across the river has been repaired and embedded in the bottom, is now substantial and in good running order. Some of the heaviest blasting ever done in this country was done on the last 2 miles of the Buckeye ditch, 50 rods being through rock, 10 rods through the rocky bar mine, and the rest through the ditch with Stuart fork being 3 ft on the bottom and through solid rock. The Buckeye ditch is the largest one in the county, it being about 40 miles, and covers much auriferous gravel. With the ditch through the river, the company will now have a full supply of water for mining purposes all the year round.

HYDRAULIC CLEAN-UP.—The superintendent informs us that the last clean-up of this company produced nearly \$10,000, making the total yield of the mine thus far this season about \$17,000. This is a splendid showing, as the ground worked had previously been drifted, and owing to a large slide, which interfered considerably, as much ground was not worked as would otherwise have been done. Everything considered the company is well satisfied with the result of the season's work, it going far toward proving their mine one of the best on the coast. With a liberal supply of water the yield would be enormous.

TUOLUMNE.

THE BONANZA.—*Independent*, Sept. 11: Recently this claim has had an accession of water, to overcome which they have cut a new ditch, and it is reported that the claim is still yielding immensely, and that in 2 days last week the owners took out \$100,000.

NOTES.—The Keltz mill is still running on good rock, and the vein is turning out good ore. A small diamond drill will be put at work immediately, to be run by the air compressor now in place.

SOUTHERN MINES.—*Cor. Independent*, Sept. 5: The new Williams process for treating rebellious ores is a perfect success and bids fair to make a revolution in the treatment of rebellious metals. The furnace is in good working order, and the tests have all proved favorable. Everything is ready to commence business. A rich chute of ore has been discovered in an old abandoned claim known as the "True Blue," which will be worked at once. They have struck a body of high grade ore in one of the drifts of the Osogood & Stanton ledge, and the best of good work, and everybody is on the tip of the tongue for the new developments that may arise from its use.

COLUMBIA AND VICINITY.—*Cor. Independent*, Sept. 7: Something like 4 months ago, a Mr. Osogood found rich lead rock on Five Mile Creek ridge, 6 miles easterly of Columbia, which led to the discovery, in a few days thereafter, of the Osogood & Stanton ledge, and a number of parallel veins in the immediate vicinity.

OSOGOOD & STANTON.—The owners have begun the development of this vein in good earnest. The prospect shaft is already down about 50 ft, showing the vein at that depth 4 ft wide. Walls are very regular. Formation, slate. This vein, taking the tests which have already been made, proves it one of the best milling veins in the county. The gold is evenly disseminated through the ore in every part of the vein, so far as tested.

OSOGOOD & STANTON EX.—This company has uncovered the vein for several hundred ft, and is driving a tunnel. Good bodies of millling ore have been found, and the vein is generally regular and of good size.

PARALLEL VEINS.—Since the discovery of the vein above mentioned, a number of parallel veins have also been found in the same locality, but that of the most importance, up to the time of writing, is a vein which T. C. Birney & Co. have located upon, which develops greater richness than the Osogood & Stanton ledge, so far as known.

NOTE.—Jacobs & Hart have located on the extension of the Birney vein. All the above mines are advantageously situated, as regards convenience of timber; and water, in abundance, can be had for milling purposes, at a trifling outlay.

NEVADA.

WASHOE DISTRICT.

SAVAGE.—Official Letters, Sept. 14: During the week we have advanced the face of the drift upon the 10th level 20 ft through porphyry carrying the stringers of quartz. Have repaired and retimbered 12 ft of the main shaft. Have completed the tank below the 2000 station, and have dug a drain and put in a drain pipe from the bottom of the 10th station to the level of the main incline. Have now commenced repairing and retimbering the 10th station.

EXCHANGERS.—The northeast diamond drill hole, 2000 level, is in 64 ft; formation, quartz and porphyry. We struck a large flow of water which forced us to stop drilling and plug up the hole. The north drift on the 2810 level is in 69 ft. The entire drift during the preceding week has been in quartz.

CON. IMPERIAL.—Have finished excavating chamber for diamond drill in crosscut west, 2810 level of Imperial, 350 ft north of south winze. During the week we have started a crosscut east of south winze station, which has been extended a distance of 28 ft.

OVERMAN.—Winze from 1000 level has been sunk 26 ft; total depth, 122 ft. Rock is somewhat harder. No increase of water. Incline upraise has been extended 32 ft. The ground is softer and working better. Forman shaft has been sunk and timbered 30 ft.

COLLAR.—Cutting out station at the 2400 level for hydraulic mining, and having completed the same for pumping engine. Engine transferred from old works and to be used in placing new pumps, etc., is in place.

OSGOD & CURRY AND BEST & BELCHER SHAFT.—We have sunk and timbered the shaft during the past week a distance of 25 ft; total depth, 1,580 ft.

BELCHER.—Making good progress in putting in new pump rod.

BRISTOL DISTRICT.

TEMPEST MINE.—*Pioche Record*, Sept. 4: There has been quite a strike in this mine, which adjoins the Hills. The leased Webster & Quigley, have struck a body of ore of the same quality as the rich ore found in the Hills.

BRISTOL CO.—The work in the mines of this company is being vigorously pushed ahead, and a large force of men is now employed. The mill is perfect, and does excellent

work. The roaster chloridizes ore in perfection. This company will soon commence shipping bullion.

STAR MINE.—At this mine everything is progressing as usual. Ten tons of ore are now being shipped, averaging \$15, and 60 in lead. A boarding house for the men is now being erected, and work upon the road is in progress. When everything is in working order, the shipments of ore will be increased, as this mine is showing great quantities of lead.

NOTE.—The refinery and furnace of the Hillsdale company are doing good work, the former turning out about 7 tons of bullion per day; coal and ore coming in fast. Another cupel furnace is under way and will be completed soon.

CHERRY CREEK DISTRICT.

STAR MINE.—*White Pine News*, Sept. 9: This is at present the largest and most populous mining district in the county. The Star mill is running steadily, and is turning out bullion regularly. About \$12,000 per week are being shipped; \$4,000 in bullion will be sent out by Tuesday's stage. The mine is looking exceedingly well.

TRACT AND GIBBS.—Work on these mines will be resumed soon, and we are positively informed that a 20-stamp mill will be erected by the company owning these mines this fall, if possible, and certainly next spring. They have ore enough now in sight to run 20 stamps for a year.

EXCHANGE.—A force of men has been put to work on this mine, and the 6-stamp mill is now being repaired, and as soon as it is ready to start up will commence working ore from this mine, a large quantity of which is in sight.

DUN GLEN DISTRICT.

LASS STYR.—We are informed by Gen. Crook, of Dun Glen, that a shaft was begun on the ledge of this mine from the bottom of the main tunnel, and in the course of a few ft the vein developed both larger and richer than it has been at any point above the level of the tunnel. The company cleaned up its mill the other day, and from a 10 days' run got \$2,250 in gold bullion.

EUREKA DISTRICT.

SILVER CONCOR.—*Sentinel*, Sept. 7: The new hoisting works of the Silver Concor are in splendid working order. Steam was generated in the boilers but a few days ago, and still the machinery runs as smoothly as that of mid silver, and from 55% to 60% in lead to the ton. It is a cut of 20 ft across the vein there are 14 ft of silver in the remaining 6 ft containing many seams of metal. The company is preparing to blast this immense body of ore, and have drilled holes ranging from 5 to 10 ft in depth.

GAOON CREEK DISTRICT.—*Prescott Miner*, Sept. 3: This district is so near Prescott that few of our residents even are informed of its great value. It contains a large number of locations, many of which have had considerable development, and yield high grade gold and silver ores. Among the claims which have yielded remarkable ore may be mentioned the Black Hawk and Gray Eagle.

NOTE.—Some time last spring Mr. Robert built a little brick furnace and smelted a few hundred pounds of galena ore, found in a streak in the Black Hawk and Gray Eagle claims. The smelting was not a success, but he gathered up about 8 lbs of the galena bullion in a frying pan and had Mr. Blake assay it. Blake's report, before me, shows the value of the bullion to be as follows: in silver per ton, \$556.05; gold, \$12,357.23.

WON RIVER.—Yauke Fork *Herald*, Sept. 4: We are informed by D. C. Coleman, who has just returned from this mining region, that the Mayflower mine is one of the most promising in the camp. It has been opened to the depth of 30 ft, and is yielding a good supply of shipping ore.

BULLION.—This claim is the first extension of the Mayflower, and has the same good characteristics. It is producing rich ore, assays of which run as high as \$2,000 per ton.

EUREKA.—This is a mine of carbonate ore of very high grade. At the surface the ore body is 2 ft thick.

NOTES.—The Treasury, Gphir and Lookout claims are being worked by the Bullion company. In the Treasury alone it is estimated that there are \$50,000 in sight. The company will push its developments this winter. The latest discovery was made by John Boyle, 3 miles southwest of Bullion. The vein has 3 locations on it, and crops out the entire 2 of them. It is 10 ft wide, and is set with sulphur, and assayed as high as \$5,000 per ton. Good judges say the rock will work as high as \$200 per ton. This strike is said to be the best on Wood river.

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county, who are dependent upon custom mills to have their ore reduced, will see that the works are kept supplied with ore.

ARIZONA.

GLOVE DISTRICT.—*Silver Belt*, Sept. 4: We unhesitatingly pronounce the Richmond lode a genuine fissure vein. It is traceable, distinctly, a long distance. There are a number of locations on it, some of them being valuable properties. The W. Richmond, Stanton, Richmond, La Plata, Defiance, Mack Morris and Caro are on this lode. The Mack Morris uses only an electric of powder to make it vomit rich ore. It is the best developed of all the mines named.

ALBERT LEE.—Mr. Brecken brought us some very good ore, on Thursday last, from this mine. This property is near Chamberlain's big mine, and promises to become very valuable.

NOTE.—The owners of the Clyde have started a shaft on their property. It shows a solid body of low grade ore, larger than the shaft. The Nugget is turning out extremely rich ore, and the samples sent by Supt. Lennon back up the statement. We have been shown some wonderful ore taken from the Champion mine during the past week.

SAN SIMON DISTRICT.—*Tombstone Nugget*, Sept. 2: Mr. P. Ward has just returned from a trip to this mining district, some 30 miles beyond Ft. Bowie and a few miles within the borders of New Mexico. He and others have several claims located there upon which some development has been done, showing well and encouraging the owners to greater development. During the present trip Mr. Ward discovered a vein of about 3 ft in width and traceable for some distance which shows on top to be rich in both gold and silver. The railroad will pass within 3 miles of the mines and is now within about 5.

NOTE.—We learn of a number of persons who are preparing to take to the mountains on prospecting trips. This is the best season of the year for such pursuits. Grass is in the most luxuriant everywhere and water is more plentiful than at any other time of the year. Many are striking for the borders of New Mexico, and not a few are turning their steps toward the Mule Mountains.

SILVER DISTRICT.—*Cor. Phoenix Exporter*, Aug. 27: Great width of ledges is a conspicuous feature of this district. The property of the Silent Co. is notable. The ore from its immense vein ranges from \$104.97 to \$5,832 in silver, and from 55% to 60% in lead to the ton. In a cut of 20 ft across the vein there are 14 ft of silver in the remaining 6 ft containing many seams of metal. The company is preparing to blast this immense body of ore, and have drilled holes ranging from 5 to 10 ft in depth.

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Progress of the Electric Light Abroad.

The fact that much more publicity is given in England and on the continent than here to the results attained by the promoters of the electric light, has given rise to the erroneous idea that little is being done here. Such is not the case, however. The applications of this light to the illumination, not alone of large spaces and of places of amusement, but also of factories and mills, are becoming more numerous. It is even rumored that Edison, of whom the public have lost sight entirely, has nearly completed works to test his light on a large scale in this city. The development in this country is steady and encouraging, because it is divested of all attempts to catch public attention by sensational reports. Abroad inventors are active and capitalists confident. The *Times* summarizes progress there in an able manner, but falls into the error of underrating the strength of the movement here. M. Gramme, who has done so much to aid this progress of electric lighting, is adapting his well-known dynamo-electric machines to the requirements of the Jablochhoff, the Werdermann, the Rappieff and other forms of the light. M. Jamin has come forward with a new light, and the Siemens light is said to be more than maintaining its reputation. The Brush light has been introduced into England from this country, and its use is extending. The Jamin light consists of three candles placed side by side, each candle being formed by two parallel carbon pencils held in a vertical position, so as to burn from the bottom. A bank of fine copper wire surrounds the candle and conducts the electric current, and is so arranged that the luminous arc is always kept at the lower end of the pencils. When one candle is burned out, the next is kindled automatically. Each candle burns two hours, and the cost of the carbon consumed is but a trifle over a cent an hour. A single lamp would thus burn six hours without requiring any attention, at an expense of not more than seven cents for material consumed, to which, of course, must be added the cost of generating the current. A Gramme machine, driven by an eight-horse engine at the rate of 1,500 revolutions per minute, sustained 12 Jamin lights, each equal to 32 candles. It was found that with a machine making 1,500 revolutions per minute, and a wire one-twenty-sixth of an inch in diameter, six lights could be sustained on a circuit of five-eighths of a mile; by doubling the size of the wire and increasing the revolutions to 2,000 per minute, a circuit of 10 miles can be operated. This light is in the hands of a French company with a capital of 8,000,000 francs, and one of its founders and directors is a man who is proprietor of about 60 gas works.

The most conspicuous success thus far has been won by the Jablochhoff system. For 18 months the Societe Generale d'Electricite, in contract with the Metropolitan Board of Works, have maintained the light on the Thames embankment without missing a single night. The lighting was recently suspended for a few days for the purpose of cleaning the engines, but has been resumed. It was found that a single 20-horse-power engine under the Charing Cross bridge could maintain as many as 80 lights between Blackfriars and Westminster, something over 2½ miles. The number of lights in actual use, however, is but 50, extending the whole length of the Victoria embankment. Experiments undertaken with a view to reducing the expense of this light have been attended with very gratifying results. The terms of this contract for the next 12 months are at the rate of 5 cents per hour for each light, and the illuminating power of each is equal to 378 sperm candles, but this is reduced by the ground glass globes to 265. The lights burn six hours, but can be burned eight. The Jablochhoff light has been successfully used for long distances and on a large scale, the Paris Salon having been lighted by it with 400 lights for two months. A Russian company has been formed, with a capital of \$4,000,000, to perfect and apply this system. A steam engine is being erected in the South Kensington museum for use in connection with the Brush light. A large court, formerly lighted by 1,700 gas jets, is now lighted by eight Brush lamps, at a cost of but 3s. per hour, a saving of 10s. per hour as compared with gas at the London price of 80 cents per 1,000 feet. Here, as well as at the British museum, the great advantage of the electric light over gas consists in the fact that it is perfectly harmless and void of danger, while the combustion of gas is destructive to paintings, decorative work and bookbindings. In a large biscuit factory at Bermondsey the light is found to possess the peculiar advantage of enabling the workmen to distinguish the most delicate shades of color, a matter of necessity in that business. Bass's brewery is to have a Brush light, and the company are about to erect works in the heart of London, intending to supply the light from a central point over a circuit of 10 miles wide. The Siemens light has been permanently adopted by the British Museum, and is in use on a large scale at the Victoria docks. The improvements recently made in the Gramme machine have increased the power of the Werdermann light, and its capability of subdivision—in which respect it is said to surpass all other lights—has led to

its application to domestic uses on a considerable scale in Paris. The supply of electricity is generated at a central point, and the light is laid on by wires wherever required with as much ease as gas. A Werdermann light equal to 300 candles, requires the use of only one-half horse power, and a 12-horse-power engine will maintain 30 lights each, equal to 300 candles. A notable feature of the progress made by all these lights is in reduction of operating expenses.

In conclusion, we may add that for European gas companies the electric light is losing much of its terror, not because of a conviction that its competition need not be feared, but because gas manufacturers are becoming confident that there is ample room both for the electric light and for gas. M. Jamin has made efforts to convince a number of representatives of the gas interest at Paris of the absence of any danger to its future growth and prosperity. From the language of one of its number, M. Jordan, it appears that they are beginning to take that view.—*Iron Age*.

A Remarkable Clock.

Probably the most ingeniously-contrived piece of mechanism in the late fair was the clock which was invented and constructed by Mr. A. Jackson, of this city. Mr. Jackson is quite an inventor, this being only one of his devices. This he calls a "pantologue," and is the result of three years' study. It is in the Art gallery near the stairs. The clock stands in a case over 10 ft. high. At the base is a globe completely mapped, giving the daily recurring motion of the earth. A hollow shaft on the axle carries the moon around the earth in its due proper course of time. The moon, which is half bright and half dark, keeps this bright side constantly to the sun, showing its various phases in the course of its journey around the earth—showing at full moon its bright side to the earth, and at the first and third quarters the half moon. Over the globe is a dial, divided into 24 equal parts, signifying the 24 hours, and painted to show sunrise, noon, sunset and midnight. To the left is an aquarium filled with water and containing living goldfish; and in the aquarium, by means of a scale, the rise and fall of the tide in San Francisco each day, with its variations, are demonstrated to a nicety. A large gold ball projecting from the mathematical center of the picture is the sun, and affixed to the sun, and revolving around it in proper rotation, are the planets, keeping, in their revolutions around the sun, their bright side to and their dark side away from it, showing day and night in each planet. A look at the painting will explain what constellation any one of the planets is in at that particular time.

There is also a calendar on which is presented the month, day of the month, and day of the week. It takes care of February very nicely. Two minutes before each hour, the figure of a messenger boy emerges from a door on the right of the clock, bearing in his hand a card marked "Time," and comes to the center. He remains standing for a little while, when Winter passes into the little cabinet door, and Spring again appears. The little bell does not strike this hour, that being struck by an electric bell in the tower, on the left-hand corner of the clock. This bell is struck by an operator, sitting in a niche, who telegraphs the moment when the messenger boy is to appear. To the right, about three ft. distant, and attached by a narrow brass rod, is an independent electric clock, admitting a current to the main clock every minute, and, though separate, governing the motion in the main instrument. To the pendulum of the electric clock is attached a thermometer, showing the average temperature, and a barometer showing the state of the temperatures. In the base of the clock is a musical box, playing a number of airs with flute accompaniment.

CHOKED STREAMS IN ENGLAND.—It seems that the English are now contemplating relief from ruinous overflows occasioned by the filling in and shoaling of their rivers. Their trouble is, however, in much milder form than our debris difficulty. We read in *Iron* that at least two palliatives suggest themselves. The lower courses of the rivers which flow eastward ought to be kept open by dredging. The Ouse, for example, is stated to be getting gradually choked with silt and weeds, so that, unless vigorous steps are taken to clear it out and keep it clear, the whole fertile valley will by and by be subject to the passage of flood waters without control. Another obvious step is the formation of reservoirs. The mean rainfall is perhaps not much in excess of the requirements of the crops, and in many parts of this country—for example, in the valley of the Thames—such a provision, in a season or two of drouth, and these come in sets, would repay much of the cost of the works; for it is estimated that last summer, in the valley of the Ouse alone, the occupiers of the land suffered a loss from floods of at least \$500,000, and it is believed that the losses sustained in the other valleys of the country were not, in proportion to their area, at all smaller.

More than 125,000 children die in France before reaching the end of their first year. One-fifth of the entire number are in Paris. In the arrondissement of Nogent-le-Roi, where mercenary baby farming is common, there are 52 deaths in every 100 children under one year of age.

Sleeping in a Volcano.

When all the stragglers had come up, a consultation was held, and it was decided that it was too late to go down that day, and that we must spend the night in the crater. Waving adieu to the world, we clambered down the wall of ice, and found ourselves on a narrow strip of warm sand, overtopping what is known as the interior lip. From this point there is a treacherous descent of seventy-five feet to the point where the wall of the crater becomes abrupt and perpendicular; and here, on an overhanging rock, is planted a rickety old windlass on which the sulphur miners ascend and descend. The windless is worked by hand. There is no cage or basket at the end of the coil. You are tied into a loop at the end of the rope, like a box of sulphur, and lowered away over the smoking abyss, the bottom of which is 300 ft. beneath you. One by one we were lowered over the precipice in this manner, and then commenced a most treacherous and difficult descent over the sloping pile of debris, from the base of the precipice, 1,500 feet down the very bottom of the crater, where the only place of safety is to be found. We had hardly commenced this perilous descent when a tremendous report saluted our ears, and a hundred tons of rocks went crashing past us on the left and rolled into the bottom of the chasm. This was a mode of salutation that we had not anticipated, but it soon became evident that the ability to dodge rocks was the only guarantee of safety here. Owing to the alternate action of heat and cold, the sides of the crater have become completely rotten, and during the heat of the day immense quantities of rocks are constantly falling. Toward morning they freeze in again, and all remains quiet for a while. During the past twenty years many men have been killed on this spot by these avalanches of stones. In order to protect themselves, the sulphur miners have built little huts in the crevices among the huge boulders at the center of the crater. Some dying convulsion swelled up a little mound at this point, and only the larger boulders, falling from the highest peaks, ever reach it. There is still danger on one side, however, from ordinary stones, and when that startling word, *pedra*, rings out through the chasm, the men come swarming out of the minas like a flock of quails, and hide themselves in well-known places of safety. On entering the crater no one escapes the dread malaria of the spot. Indian and white men alike go down, with flying pains in the head, and a nauseating feeling at the stomach that is worse than sea-sickness. Conklin, of our party, seemed most affected. He had strength enough to crawl to one of the huts, and there he sank down on a mat in an almost insensible condition. It was not long before the rest of us joined him, and then commenced one of the most unpleasant nights I ever spent. Seven of us were confined in a space of about six by seven feet. It was impossible for any man to stretch himself out to full length. Nearly all of us were deathly sick, and combined with these discomforts was the constant fear of being crushed by the falling rocks. All night long they fell with fearful reverberating echoes from the surrounding cliffs. We were told that more than usual came down, owing to the fact that the preceding day had been a little warmer than common. In contrast with the booming sound of these flying boulders, came the sucking, snoring sound of the great *respiraderos* all around us. These breathing holes, or vapor-jets, are six in number. They are in constant action, and throw off immense quantities of smoke and vapor, with now and then a lurid tongue of flame. All the heat of the crater is not confined to these spots, however. Little jets of steam creep out from every crevice, all the rocks are warm, and it is impossible to find a place to lie down where you are not tormented by curling whiffs of sulphur smoke rising from the earth beneath you. Toward midnight I found it impossible to endure my cramped position in the hut any longer. Every muscle in my body ached, and, as sleep was out of the question, I gathered up my blanket and made my way out into the open air. A scene of the most weird and awful character presented itself. The crater seemed full of smoke. Detached clouds of vapor waved themselves back and forth along the cliffs like ghosts, and as I listened to the hoarse breathing of that mysterious power which I could not see, I thought of the wild Aztec legends connected with the spot, and, in my superstitious mood, I half believed that the restless spirit of their departed chiefs had risen to confront and haunt me for my intrusion into their dread abode.—*D. S. Richardson in September Californian*.

The influence of very small quantities of foreign substances in modifying processes of chemical change is a subject of much interest to the chemist, although as yet no full explanation has been given of this class of phenomena. In the course of his researches at high temperatures, Victor Meyer has given one or two instances of such reactions. Thus he finds that ferric chloride, aluminium chloride and zinc chloride are decomposed with evolution of chlorine at much lower temperatures when the vapor-density apparatus is previously filled with nitrogen gas than when no foreign gas is present. Meyer cannot trace any connection between the temperature, or amount of decomposition, and the chemical nature of the foreign gas.

What Vivisection Has Done for Man.

Dr. Charles Richet, in a vigorous defense of the practice of vivisection, demands that it shall be judged by its practical results, and claims that, if it can be shown that we have gained by that method of experiment the means of curing one or two diseases of man or of assuaging pain, it must be considered lawful. He cites a number of discoveries that have been made through vivisection to sustain his position. Among them is the discovery of the circulation of the blood. Galen established the fact that the arteries contained blood by observations in the artery of a living animal; Herskovy opened the chests of living animals, cut into the pericardium, observed the contraction of the heart, and what was going on in the veins and arteries, and deduced from what he saw his theory of the circulation. Transfusion of blood, an operation resorted to in extreme cases with the best results in saving life, was introduced after its possibility had been ascertained from experiments upon animals first made in 1664 by Lower, and afterward by Denis. "Experiments alone," Dr. Richet says, "will teach us precisely what quantity of blood is necessary and what is harmful; and if over-sensitiveness forbids animal suffering for this end, then the experiments would have to be made on human beings." The mode of death from the inhalation of carbonic oxide, and, correlatively, the method of avoiding or preventing death from inhalation, have been made known only through vivisection. So also "all that we know in hygiene of the quantity of air necessary to support life is the result of experiments on dogs and rabbits. Sometimes a precise knowledge of the conditions of respiration has served to prevent men from perishing." Only two methods exist by which we may learn the conditions of gastric digestion and collect its secretion, viz., by observation of gastric fistulae produced by chance in man, and by artificial fistulae in animals. The first method has been possible only in three or four instances, but the effect of food on the gastric secretion in dogs and cats has been largely observed; and the knowledge of the remedies which have been applied to the relief of dyspepsia has been derived from such studies. Our knowledge of nutrition has been largely added to by means of experiments in which dogs and cats have been submitted to varied alimentation, and from which the quantity and quality of food necessary to sustain life have been deduced. What we know of the nerves has been gained from studies of animals, as have also the means of relieving neuralgias and paralysis, in which, thanks to the scientific analyses of the vivisectioners Fritzsche, Hitzig, and Ferrier, "we can pass from this effect to the cause, and assign to paralysis a central lesion at a well-determined spot, so that trephining at this spot may cause the paralysis to disappear." The experiments of Galvani and his followers on frogs have taught us to estimate the effect of the electric current on nerves and muscle, and shown us how to apply galvanization to the prevention of the paralysis which ensues from the destruction of the motor nerves. The numerous patients relieved of nervous diseases "by this admirable therapeutic agent have no call to speak ill of such vivisectioners as Galvani, Aldini, Volta, Magendie, Marshall Hall, Remak, Du-Bois Reymond, and many others, since it is to their discoveries that the relief of their ills is owing. Would Galvani have made his discoveries had he refrained from dissecting frogs? Would the electric current have been applied to atrophied limbs if it had not been found that the action of this current in dogs was salutary and not dangerous? Certain diseases of the urinary organs have been studied in animals. The treatment of sympathetic ophthalmia by section of the ciliary nerves of the diseased side has been shown to be advantageous by experiment, and the results yielded by experiments on dogs and rabbits have been applied to patients. The correct treatment of cataract has been similarly learned. Encouraging progress is made by vivisection in the study of the formation of callus, of pseudarthrosis, of osseous grafts, of regeneration of bones by periosteum, subjects of great importance in surgery. The vasomotor theory, which plays a large part in the medicine and surgery of the present day, has been established by experiments on the great sympathetic and the rabbit's ear. Dr. Brown-Sequard has furnished useful ideas relating to epilepsy and tetanus from the results of painful experiments on dogs and Guinea pigs. Trial on animals is useful to determine the action of new medicines, for "we do not wish to experiment on man at the risk of poisoning him, where animals can be employed," so with poisons. Finally, if we deprive savants of the right to submit living animals to experiment, we shall go back beyond the days of Galen. "If all those who have been relieved—verily made to live again"—says Dr. Richet, "by modern medicine and surgery, could speak, they would confound those who load vivisection with calumny, and they would hold that their own life and sufferings weighed more in the balance than the sufferings of those animals which have been sacrificed in laboratories to the lasting benefit of man."

M. POINCARÉ has presented to the Academy of Sciences, Paris, the results of an investigation of butcher's meat, in which he found cylindrical pointed elements with cuticles crossed by lines which seem outlines of cells, and which appear granulated. He thinks they may be phases or metamorphoses of tanioids, causing tenia in some eaters of raw meat.

Improvements in Traveling.

It is only by means of comparison, says the *New York Times*, that one can definitely realize the great improvements in the method of traveling that have taken place within the present century. The changes occur so gradually that they make but little impression upon us. For example, now that the railroad time needed to make the trip between this city (New York) and Philadelphia has been reduced to less than 100 minutes, there are already those who are predicting that in no more time than five years trains will cover the distance between these two cities in a single hour, and no one is the least surprised at the assertion. In 1800, those who traveled in this country did so on little personal discomfiture, and with an expenditure of time that would greatly interfere with business as it is now carried on. A man wishing to go from this place to Boston left Moudry forenoon and arrived at his destination on Friday afternoon, stopping all night at New Haven, New London and Providence. The fare for the trip varied from \$15 to \$18, and there was an additional outlay required of from \$5 to \$6 for board and lodging; that is, the trip took up four days of time and called for an outlay of from \$20 to \$24. After the war of 1812 there was an improvement, and the time between this city and Boston was cut down to about two days, and the cost of the journey to \$14. In 1817, the fare between New York and Philadelphia was \$10, and between New York and Albany by boat \$7, and the average time 24 hours. A route was that year opened between Philadelphia and Quebec; the distance 700 miles, fare \$47, and time required to make the journey 103 hours. In 1826, the Boston newspapers recorded the circumstance, as one worthy of special comment, that New York papers had been received in that city in 24 hours after the date of their publication. In 1828, the time required to make the journey between these two cities had been reduced to 21 hours, the route being from this city to Providence by steamboat, and from thence to Boston by stage. But in winter these trips were frequently given up in consequence of stormy weather, and those who wished to avoid danger and be certain in their movements still preferred the overland route. In 1832 there were two regular stage lines between this place and Boston, but competition had greatly reduced the fare. The slow line made the distance in about 52 hours, and charged for passage \$7.50, while the fast or mail line took its passengers through in about 45 hours, and charged them \$8.50 a trip. A short time after this the railroads came sufficiently into operation to make it unnecessary to run through trips in stages, and the latter were chiefly used to connect the termini of the slowly building railroads. Having made the progress that we have, there is not the least likelihood that the work of improvement will not go on. The history of railroad accidents show that, while trains on some roads run at a slow rate of speed may meet with mishaps, there is relatively little danger in running at the highest possible speed on a road that is thoroughly constructed, where the appointments are as nearly perfect as possible, and the supervision constant. On this account one does not have to be unduly sanguine to think that long before the century is out we shall be able to go from Jersey City to Philadelphia in an hour's time, and from the Grand Central depot to Boston in a less number of hours than the number of days spent by our ancestors, in the year 1800, in making the same trip.

COLORADO COAL DEPOSITS.—A late number of the *Leadville Chronicle* contains an account of immense deposits of coal at Canyon City, the discovery of which is of great importance to the smelting operations of Leadville. These coal fields, it says, are more than 50 square miles in extent, with working veins extending through 800 ft. as tested by diamond drills. The workings at present actively employed range from one and a half to 10 miles, and are now producing 800 tons daily, which may be increased without extra expense to 2,000 tons. Experts pronounce it the best of coal for all locomotive and other machinery. From its surplusage of pure carbon and freedom from sulphur, it is believed to be adapted to any kind of smelting and reducing process. It can be delivered at Canyon for \$1.75 per ton. The Atchison, Topeka and Santa Fe Railroad Co. are constructing a broad gauge coal road from Pueblo to the coal lands of the Grand Canyon Coal Co., which will be completed within a short time. Two-thirds of the demand of the whole State, which is at present 1,500 tons daily, it is claimed, can be supplied from here, and at present the daily output ranges from 700 to 900 tons. All the coal of the Canyon district is easily worked. It is bituminous in character, and of the best quality, and readily sells for \$2 per ton more than any other coal in Colorado. It will not slack or decompose when stacked or corded. The lower vein is fully 5 ft. thick, and all coal taken therefrom is of the first quality, free from slate or other impurities. It needs no timbering, as the cap-rock is very firm. It is here, very evidently, that Leadville's future supply of cheap fuel must come from, unless the remaining locality, that of Como in the South Park, should prove to be still more available.

PAPER STOVES are the latest development of German ingenuity.

USEFUL INFORMATION.

To Distinguish Dyes in Colored Goods.

It is often necessary to know with what coloring matters a pattern has been dyed. In some cases an experienced dyer can soon ascertain, almost at a glance, or by simple methods, which dyestuff has been employed; but with many colors this is sometimes impossible. Especially is this the case with blue dyed fabrics, in which it is not easy to say whether a pattern has been dyed with vat indigo alone, or has been topped with cheaper stuff.

The detection can be made by a chemical analysis, the method consisting in destroying one of the coloring matters by some reagent, and thus prove its existence by the use of this destroying medium. To ascertain which mordant has been used, it is only necessary to burn a certain quantity of the fabric, and to find out by chemical analysis which oxide was present on the fabric. These methods are, however, only of use to chemists; but the following is a simple method that may be employed by anybody to determine the coloring matter. To begin with blue dyed fabrics. *Vat blue*, in the first place, is neither affected by alkalies nor acids (with the exception of nitric acid). Only chlorine and chlorino compounds react on vat blue.

A blue dyed with *sulphate*, or *extract*, or *carmine of indigo*, is readily abstracted by boiling water, and even more so by caustic alkalies.

Prussian blue is easily recognized by using alkalies which destroy it, while chlorins and acids have no effect upon it. However, the alkaline chlorins compounds of commerce (bleaching powder, etc.) react upon it.

Goods dyed with *logwood* give, with acids, a coloration more or less yellowish. In case there is another color associated with logwood, this latter may be extracted with a large quantity of acid. The fabric is then well washed, and the remaining color examined.

The red colors are more difficult to determine; but these colors have not the same importance as the blues.

Colors dyed with *cochineal* and *Brazil wood* (which, however, every dyer can easily distinguish) become gooseberry red when treated with muriatic acid. If it is washed, and then passed through milk of lime, a pretty loose violet is obtained. *Madder red*, treated exactly in the same way, and after the milk of lime bath boiled with soap, acquires a more intense color.

Cochineal red and *Brazil wood red* can be easily distinguished by means of oxalic acid, cochineal red becoming brighter, while the other is more or less destroyed.

Black, which is generally dyed by two methods, either with iron or chrome, when treated with chlorins, is destroyed if dyed with iron; but, if a chrome black, resists to a certain extent, only becoming chestnut brown, even with strong treatment.

To distinguish other colors there are many methods, which are, however, too complicated to be mentioned here. Aniline colors require greater chemical knowledge to distinguish them from each other.

ALLOY PRESERVATIVES.—It is well known that the action of a third party, however slightly electrical, may modify catalytically the electro-chemical action of two others. This electro-chemical fact has led to the arrangement of a great number of alloys of various atomic proportions stated to be non-oxidizable, but as the nature of the reactions of such alloys upon their own oxides is not thoroughly understood, the production of the long-sought-for non-oxidizable alloy protector has not as yet been completely realized. Certain alloys, however, are said to possess great merits as electro-chemical preservers of iron. The alloy composed of 23 parts of zinc and 8 parts of copper, has been proved by experience to possess a minimum factor of oxidizability, and to be a great preservative of iron and steel. The alloy proposed by M. Soriel is stated to be almost unoxidizable, equal to iron in hardness and more tenacious than soft iron. The alloy is composed of 80% of zinc, 10% of copper, and 10% of iron.

The floating of birds on and with the wind does not appear specially mysterious. It is now recognized that a breeze of air is a succession of denser and denser volumes, rushing in to supply the place of comparative vacuity, and thus to maintain pneumatic equilibrium. Passing along the surface of land or sea, this succession of densities possesses the properties of a wedge, tending to lift from the ground objects whose specific gravity is greater than that of air. Thus, on a windy day, thistledown, feathers, straw, paper, may be seen floating on the "wings of the wind;" and should the gale increase to a hurricane, trees, roofs and even cattle may be lifted from the earth. Inanimate objects being in this way capable of sustentation, it is not surprising that a bird can adjust its wings in such a way as to appropriate to the full the floatative power of the wind.

TO RELIEVE CASKS FROM MUSTINESS.—Burn a little sulphur in the empty casks, bung, and let them stand for a day.

A SERIES of experiments is soon to be made with Capt. Ericsson's new system of submarine attack.

ARTIFICIAL PEARL.—M. Duvochel has invented a compressed kind of nacre or pearl, made of the pulverized shell of the halotis, solidified with gelatins. Thus prepared it will serve for inlaying or mounting in cabinet work, cartonnage, tablature and other industries, and the manufacture of fans, buttons, etc. This product can be figured, stamped, molded by pressure, poured out in the liquid state, and, in fact, takes every kind of form desired. It can be dyed in any color, polished and varnished by the processes used for tortoiseshell, mother-of-pearl and other analogous substances. To render the shells thin and friable, they are submitted to a strong heat, which separates them into thin scales; these are then pressed in the cylinders of a flattening roller, and afterward pounded in a mortar. It is then sifted to get rid of the dust, and this powder is treated with gelatine, and formed into any shape required.

TO TIE THE COTTON CROP.—About 75,000 miles of hoop iron—enough for a three-fold girdle around the earth—will be needed to bind the forthcoming cotton crop, if it reaches the number of bales predicted by statisticians, or 6,000,000 bales. The number of bands required is six to a bale, or 36,000,000 in all. They are of uniform size, 11 ft. in length, and 1,200 weigh a ton. Hence there will be required 30,000 tons of hoop iron. Cost about \$3,000,000.

THIN GLASS COVERS.—A microscopist has taken the trouble to measure the thin glass covers purchased at a first-class house, and found that in two ounces but 4 were correct in their thickness 1-150 to 1-200 of an inch, 4 belonging to a cheaper grade. Only 1-68 were 1-200 of an inch in thickness, the majority being only fit for opaque objects.

MERCURY AND LEAD.—If a piece of lead wire be hung perpendicularly over a vessel of mercury, the lower end immersed, the mercury will gradually permeate and ascend the wire to a height of three ft. in a few days.

GOOD HEALTH.

Dr. Tanner's Great Task.

It should not be his lost sight of, says the *Scientific American*, that the fasting of Dr. Tanner was very different from cases where a fast is held by necessity, such as being compelled by disease, by shipwreck, by being lost in a wilderness or forest, being hurried in a mine, or lost in a cave. Dr. Tanner had enormous advantages over all these cases, and hence, he could indulge at once in hearty meals, as his digestive apparatus was not impaired by disease, nor his nervous system shattered by anxiety; in such cases it would be very dangerous, if not fatal, at once to indulge immediately in such abundance of food. In the case of shipwreck, the exposure of the survivors, resulting in a total want of any comfort, but to the enduring a suffering from other distressing discomforts, and exposure to the elements, contributes as much if not more to the fatal results than the need of nourishment. To this must be added the anxiety and uncertainty which keeps the nervous system upon an exhausting strain. It is the same with those being lost in a wilderness or forest. Of these the forest gives the best chance of survival; but in case of burial in a mine, the utter want of light and the gloom surrounding the victim, combined with the extreme anxiety, make a fast under such circumstances the most destructive to the nervous system. Persons who, for instance, were lost in caves, such as frequently happened in the Mammoth cave, were, after only a few days' search, found to be nearly insane, so much so that they hid themselves from the searchers.

It is evident that Dr. Tanner had an easy time, if his fast is compared with that of any of the fasters for causes mentioned above. If he had been locked up under threat that no food would be given him for 40 days, he surely would not have stood it so well, as the mere consciousness of the constrained situation would have affected his mind, and all ease and comfort would have been at an end. To the contrary, his mind was kept at peace because he had plenty of air and water, the comforts of good shelter, and all the conveniences of life.

These facts were overlooked by those who from the first declared a 40 days' fast an impossibility, and staked money on it. They were not well informed about actual fasts for so long a period, of which there are instances on record, or they did not believe the truth of such records.

Dr. Tanner may not have proved that everybody can fast 40 days, but if he has only proved that man can fast longer than has generally been supposed, that we are all eating too much, and that for a family remedy, fasting affords a better, safer, and more economical cure than the taking of all sorts of patent medicine, to which many people are so much addicted, he has done a really good work.

WHAT CAME OF JUMPING THE ROPE.—Dr. Peck, of Indianapolis, has amputated the legs of a young girl on account of decay in the bones, produced by excessive rope-jumping. He advises parents and teachers to prohibit this play under all circumstances.

May Girls Jump the Rope?

A surgeon in a Western city has published an article designed to warn parents against allowing their children to jump the rope, an amusement of which they are very fond. His objections to this exercise are that it produces a continuous concussion of the joints in the spin column of a dangerous character, often resulting in inflammation and necrosis of the bone, deformity and death. He concludes by saying: "I would warn children against rope dancing, and advise parents to prohibit it under all circumstances." His opinions are founded on the fact that he has seen very bad results from the practice. While we do not doubt that jumping the rope may be carried to a dangerous extent, we deny that it is a dangerous exercise. It is only when carried to too great an extent that it injures, or when practiced by very delicate children longer than it should be. Children in their sports are apt to go to extremes, and here lies the danger. How many thousands of children have lost their lives by eating too much food, or eating unwholesome food, and yet we do not prohibit our children from eating, but try to teach them how to do it right. Many children lose their lives in the water, yet we continue to teach our children to swim, and shall to the end of time. Children become injured by jumping the rope, and the wise course is to teach them not to go to extremes in this or any sport. Jumping the rope is of itself a perfectly safe exercise. It is one that children enjoy. It cultivates all the lower parts of the body in a remarkable manner, giving skill and grace of movement. Mothers need not prohibit it, but only watch their children so they shall not go too far in its practice.—*Herald of Health.*

HYSTERIA.—WHAT IS IT?—What is hysteria? asks a young lady who says some day she will study medicine and be a physician, even if for no other purpose than to know about the body, so wonderful in its make-up and its action. In reply we may say that hysteria has been defined in many ways by many physiologists, but in our opinion most of their definitions are faulty in many ways. Hysteria is a sort of nervous strain, in which nervous action breaks over all restraint of the will and the judgment, forsakes its normal course and gives rise to incoherent, unnatural, irrational ravings. Hysteria is a sort of insanity. The forces in the nervous system, like the forces in nature, are subject to various disturbances. In nature they break out in thunder-storms, hurricanes, etc. In the human body we have instead, hysteria, passion, and other phenomena. If we could control the distribution of heat and cold in nature, we could modify or do away with violent cosmic changes by equalizing everything. The same would prevent hysteria. Equalize the circulation of the blood in the human body and hysteria would rarely if ever appear.—*Herald of Health.*

THEY HAD ALL HAD IT!—A health officer writes to a Canadian medical journal as follows: "Inspected a house in the country at the request of the attending physician, as the general health of the family had been bad for a long time, they having suffered from a class of complaints that would indicate bad drainage, etc. Found under the floor a wooden drain with rotten cover, and soil saturated with sewage; trap on water-closet non-effective; water-closet foul; situation very bad; ventilation so arranged as to poison the room above it, a sleeping apartment occupied by a young man suffering for a long time from general ill health. No trap on kitchen sink; water supply, cistern connected directly with the sewer without traps in the overflow pipe. On my reporting the latter fact to the family, and expressing my surprise that they had not all had typhoid fever, they exclaimed in chorus, 'Oh, we have all had it!'"

It is a sin to be sick, says an exchange, unless the illness is hereditary, and sickness is reformatory punishment of violated law, always. But "In knowledge there is power," and in order to make people healthy they must learn the laws of health, and the results of disobeying them. In every walk of life there is need of more self-knowledge. The most enlightened sometimes touch the harp strings of life too roughly, and the harmony of sound is soon destroyed. But ignorance, self-will, gratification of appetites and passions have kept misery in the world, and probably will continue to cause disease and untimely death for many years—at least until we reach a higher plane of intellectuality, and learn to live simply and in obedience to hygienic laws.

HOW SHIPS ARE DISINFECTED.—The following system of disinfection is recommended by the Austrian government for vessels that had cases of small-pox on board: Sulphur to the extent of 12 grains per cubic meter of space to be disinfected is to be burned in an earthenware basin, placed in the center of some sand to prevent all risk of fire. All the linen, clothes, etc., are to be hung across the cabin, which is to be hermetically closed for three hours, and afterward exposed to the strongest possible drafts of air for 12 hours. Then the walls, floor, ceiling, etc., are to be washed with one kilogramme of lime or one-half a kilogramme of chloride of zinc to every hundred liters of water.



W. B. EWER.....SENIOR EDITOR.

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The Week.

This is the season of fairs. The fair of the Mechanics' Institute closed in this city last week after a successful course of five weeks. The receipts were about equal to last year's exhibition, which lasted one week longer. The fair, or rather, the industrial exhibition, is, if wisely conducted by practical men, an efficient stimulator of ambitious enterprise, and at the same time a pleasant way of educating the youths of the State.

Since its arrival in this city the Presidential party has in the main enjoyed itself in a quiet and unostentatious manner. Among other notable places, the President visited the Chinese quarter, and saw the yellow man in the parlor as well as in the slums. According to the report of the visit, the filth and naughtiness disclosed were almost unspeakable; and it would seem that the President must have felt himself impelled to utter a summary veto.

At present general business both in the city and the State is dull. The Presidential campaign has been fairly opened, and popular interest is absorbed in the political struggle. The shadow of the contest has already fallen upon the interior towns, and now politics, and not mines or farms, burden the columns of the papers. After November there will come a sharp reaction, and all forms of industry will move the brisker after the temporary lull.

A VETERAN DIGGER.—In a report of a field trial in Australia we read: The digging match created no little interest, from the fact that a gentleman nearly 70 years old entered as a competitor, three young men having had a start of about 10 minutes. He, however, carried off the palm, making a much better and earlier finish than either of the younger competitors.

A COMPANY has been experimenting in Florida with palmetto for making paper with such gratifying success, that they will build 20 paper mills in various parts of the State.

Emotional Economy.

There is in every community a class of people, well-meaning and generally zealous, which looks at and approaches all questions through its emotions, and decides affairs of the greatest moment by its warm feelings rather than by its cool reason. The very earnestness and zeal of this class is often a menace to some valuable interest or beneficent industry. These lively people seem never to consider that our systems of economy, whether social or political, are based upon the best experience of the civilized world, and have been tested by the severest practical ordeals. Evils abound, unfortunately, in every community, and it is the province of intelligent men, and no less their duty, to endeavor to trace them to their sources and to suggest or point out the appropriate remedies. But these emotional economists seldom scent an evil with a "cold nose;" they no sooner perceive an evil, the existence of which every rational man deplores, than they gush and bubble and boil with emotional wrath, and would incontinently pluck it up by the roots. Under the conviction that they do well to be angry they would destroy without reason and without intelligence, and for every devil they cast out they would put a dozen in possession. There are many examples in point.

In this city not long ago, one who is devoted to the cause of temperance—that is, abstinence from alcoholic drinks—declared in a public lecture that he was unspeakably glad because of the presence in California of that pest of the vineyard, the phylloxera; and he expressed the hope that the last vine in the State would be destroyed by its ravages. He would be delighted, he said, to see grain fields take the place of vineyards, to the end that the accursed traffic in wine might be destroyed. The strong emotions of the lecturer stamped his rational faculties, and the reform he proposed for an alleged evil would introduce a score of grosser ones. This mode of thought seems like a form of mental disease, and cannot be met by any method of reasoning. To propose the destruction of a beneficent industry growing out of the product of one of the most useful and wholesome gifts to man—the luscious, inspiring, health-giving grape—because, besides being food and health and joy to human beings, it was also converted into intoxicating drinks, seems the very ecstasy of perversity. The same kind of reasoning would uproot every orchard; it would bring sterility to our grain fields, and practically close every human mouth to bread.

It is admitted that mining for the precious metals—for gold and silver, which form the standard of value, and are of incalculable advantage to human society—is one of our greatest and most beneficent industries. Indeed, mining is the essential germ of California's wonderful growth. And yet there are people who would destroy it because of its relation to the stock exchange. Quite recently we read in a class paper, published in this city, a column of fierce fulmination against the practice of selling the shares of mining incorporations. The blow was aimed at mining as well. For the writer exclaimed that he would rather see wheat selling at \$2 a cental than to learn that a \$100,000,000 bonanza had been developed on the Comstock! There have been disgraceful transactions in mining shares in this city; the Chicago Grain Board is not without its low scandals; and the operations in railroad shares at the exchange in New York are a stench in the common nostril. What then? Shall mining and wheat growing and railroad building cease because of the dishonesty of some operators and brokers? Yet this is the logical result of the policy of the emotional economist. Every rational man knows that the stock exchange is not an unmixed evil. It has promoted mining enterprises and brought them to fruition, the successful prosecution of which was impossible without its aid and influence. So far as the integrity of the average stock-broker is concerned, we believe it will compare favorably with that of any other class of business men. Some time ago the *New York Nation*, which is the avowed and critical foe to every form of wrong, while speaking of the morals of the Wall Street brokers, bore cheerful testimony to their general fairness and honesty in transactions frequently involving millions of dollars. While daily exposed to tremendous temptations, the rule of practice was honesty and accuracy.

RALPH WALDO EMERSON.—Our distinguished countryman contemplates another, and, in his belief, final, visit to England next year. The London correspondent of the *Manchester Guardian* says Mr. Emerson has been moved to do this chiefly by what he has heard of the declining health of Mr. Carlyle, between whom and himself there has been, ever since they first met, the deepest sympathy and affection. Mr. Emerson is also anxious to make the acquaintance of several distinguished Englishmen, conspicuous among whom is Cardinal Newman, whom he characterizes as "the most religious man in England." As a proof of the growing favor of Mr. Emerson's writings, it may be mentioned that a well-known publishing house meditates the issue of a cheap edition of them, about which it will negotiate with Mr. Emerson on the occasion of his visit to London.

Registering the Cost of Mental Effort.

An apparatus, called the plethysmograph, by which mental effort, causing the expenditure of more or less blood, is measured, is one of the curious inventions of the day. Of course every word uttered by a speaker, every idea thought out by a writer, is attended by some physical loss, and, as has been remarked by an eminent naturalist, the speaker or writer "burns that others may have light." In one of Balzac's stories the hero becomes possessed of a magical wild ass's skin, which enables him to gratify all his wishes; but its surface represents the duration of the writer's life, and for every satisfied desire the skin shrinks in proportion to the intensity of the enjoyment, until at length life and the last vestige of the skin disappear with the gratification of a last wish.

Happily, our matter of life differs from the novelist's ass's skin in its capacity of being repaired and brought back to its full size after every exertion by rest and food and sleep. Any strain of the nerves or of the brain—like the labor of an editor or a lawyer, for instance—somehow takes blood. Dr. Holland has said that people who relished the interest of their morning paper little thought of the drain of blood which the printed sheet represented. But now, thanks to the tireless efforts of science, we may learn how much blood a thought, a strain or an emotion costs us.

This highly interesting announcement was made at Boston the other day by Prof. Barker, of Philadelphia, before the American Association for the Advancement of Science. The professor told his hearers that Dr. Mosso, of Turin, has measured the consumption of blood by the brain in its diverse mental acts. The arm of the subject to be operated upon is inclosed in a vessel tightly, the empty space being completely filled with water. If blood flows out of the arm to the brain, the vessel will hold more water; if the flow of blood is from the brain, water will flow out of the vessel; so that by a very simple apparatus we have a register of the demand of the brain for blood for any purpose. Here are some curious instances of the operation of the plethysmograph: Dr. Pagliani, whose arm was in the apparatus, was requested to multiply 267 by 8, mentally, and to make a sign when he had finished. The recorded curve showed very distinctly how much more blood the brain took to perform the operation. Hence the plethysmograph is capable of measuring the relative amount of mental power required by different persons to work out the same mental problem. Indeed, Mr. Gaskell suggests the use of this instrument in the examination-room, to find out, in addition to the amount of knowledge a man possesses, how much effort it causes him to produce any particular result of brain work. Dr. Mosso relates that while the apparatus was set up in his room at Turin, a classical man came in to see him. He looked very contemptuously upon it, and asked of what use it could be, saying that it couldn't do anybody any good. Dr. Mosso replied: "Well, now, I can tell you by that whether you can read Greek as easily as you can Latin." As the classicist would not believe it, his own arm was put into the apparatus, and he was given a Latin hook to read. A very slight sinking of the curve was the result. The Latin book was then taken away, and a Greek book was given him. This produced immediately a much deeper curve. Again, this apparatus is so sensitive as to be useful for ascertaining how much a person is dreaming. When Dr. Pagliani went to sleep in the apparatus, the effect upon the resulting curve was very marked indeed. He said afterward that he had been in a sound sleep, and remembered nothing of what passed in the room—that he had been absolutely unconscious; and yet every little movement in the room, such as the slamming of a door, the barking of a dog, were all marked on the curves. Sometimes he moved his lips, and gave other evidences that he was dreaming; they were all recorded on the curve, the amount of blood required for dreaming diminishing that in the extremities. The emotions, too, left a record.

IMPROVEMENT OF THE UPPER MISSOURI.—We learn from the *Helena Independent* of the 2d inst. that about 70 men are now employed by the Government in making improvements in the upper Missouri river, near Dauphan's Rapids, and it is informed that hereafter there will be little difficulty in navigating the stream until quite late in the fall. Boats have already transported to Benton about 9,000 tons of freight, and some 2,000 tons more will, it is hoped, be brought up the river before the season closes. This has proved so far an excellent season for freighting, and the river is two ft. higher than it was at the same time last year.

MILL MACHINERY FOR COLORADO.—It is stated that James R. Keene and other capitalists in New York, having purchased the Silver Cliff mine in Custer county, Col., contracted with eastern parties for the erection of a quartz mill. The mill failed to work the ore. The story goes that, instead of levying an assessment on the stockholders, Mr. Keene individually and at his own expense, contracted recently with a firm of this city for a mill to work 100 tons of ore per day, to replace the one of Eastern manufacture.

Rare Gold Quartz.

One day this week we saw a handsome collection of the richest gold-bearing quartz that we have seen for a long time. Indeed, several large pieces might properly be described as quartz-bearing gold, so greatly did the metal predominate over the mineral. In the collection, besides the rich specimens of quartz, there were fancifully shaped nuggets of fine gold, and others with little points of brilliant whitish quartz; there were coarse gold, gold dust, hammered gold and gold amalgam. Of the soft, malleable gold, which had been hammered out of the matrix and beaten flat, there was enough to fill a pint cup. The sight of this golden variety was sufficiently fascinating. This fine collection was brought to our office by Mr. W. W. Faher, who is the owner of the mine from which it was obtained. The mine is called the Faher, and is situated in El Dorado county, about four miles from Latrobe. The quartz occurs in a slate formation. The claim comprises two parallel veins about 20 ft. apart, and the veins vary in size from 6 inches to 2 ft. Both veins are opened by inclined shafts, the deepest of which is only 80 ft. In the deep incline, at a point some 50 ft. from the surface, occurs the nest or chimney from which the rich quartz and gold we have described were taken. In reply to our question as to the extent of the chimney, Mr. Faher said he had merely cut through a section of it, and that it lies there in mass at one side of the incline. Mr. Faher left at Wells, Fargo & Co.'s office, one mass of quartz, weighing 30 lbs., the surface of which is gold covered. He had with him one piece weighing 17 ounces, which contained 8 ounces of gold. The gold is of superior fineness, a mint certificate rating a lot of it at .935. The locality of the Faher is celebrated for the occurrence of the richest gold-bearing quartz. About a dozen years since a miner named Spawm took out of his claim in several days the splendid sum of \$25,000, and before he discontinued the work the mine had yielded \$100,000. This account was given by Mr. Faher, whose own experience in the neighborhood helps him to believe the story.

Insuring Miners' Lives.

The proposition to make the mine owners of Great Britain insure the lives of their miners is meeting with great opposition from the owners. This system is provided for by the "Employers' Liability Bill," and complaint is made that this is another straw to help break the camel's back. The effect of recent legislation has been to heavily tax mine owners, and this will be an additional burden. In some of the large collieries this would make an increase of expense of from \$15,000 to \$20,000 a year. The *London Mining Journal*, commenting on the proposition, says: "Why an employer should be so taxed, whilst the workman should become even less provident than he is at the present time, is not so logical a conclusion as might be expected from a judge expectant. Our leading men have long been endeavoring to inculcate habits of thrift upon the working classes, but the proposal of the Attorney-General is that of an entirely opposite course, for he would make employers do everything for their work-people without any counter-balancing advantages. Mine owners are now heavily handicapped, and to still further impose liabilities upon them, such as insuring the lives of those whom they employ, would simply be to cause serious loss of capital, and at the same time lessen the number of persons employed in mining operations."

It really seems that if there is to be an insurance it should be mutual, to say the least, where both masters and men should be interested in contributing towards it. Some such plan as that would be excellent.

THE NATIONAL PARK.—It appears that the natural wonders of the Yellowstone National park have made a strong impression upon Secretary Schurz, who recently, with Gen. Crook for a companion, made a horseback tour through the region. He has expressed great indignation at the depredations that are annually perpetrated there. In the park game is very abundant, and includes elk, deer, antelope, bears, and other animals; but the gamekeepers provided by the Government are insufficient to prevent the wholesale destruction of hunters, who are killing the animals merely for their skins. The entire unwholesome brood of curiosity hunters is also inflicting much injury by removing treasures which would have exceeding value to intelligent tourists. Around the geysers and other springs in the park there are many rare specimens of etalagmites and coralline depositions, which have required ages for their formation, all of which are liable to be injured or carried away by the vandals. The Secretary has expressed regret that proper action was not taken long ago for the preservation of the park, and it is his purpose to urge upon Congress the requisite legislation for the prevention of the depredations which are despoiling it of many of its beauties. We hope something efficient will be done at the earliest moment, for a further delay of five or ten years might work irreparable injury. Our forests are defaced and in course of destruction by the epilers. Let us make an earnest effort to keep their ruthless hands off of the National park.

Silkworm Culture in America.

The uniform failure of experiments in the culture of the silkworm in this country is the subject of an interesting article in a recent number of the New York Sun, the chief facts of which we present in the following summary. King James I of England made strenuous efforts to compel the planters of Virginia to grow mulberry trees and raise silkworms instead of tobacco, but always in vain. Under the Commonwealth no thought apparently was bestowed upon the pet project of James; and silk culture in the New World was left to its own attractiveness and promise of profit. It would not be possible to cite any other interest to which so much earnest effort has been devoted in this country with such an unbroken record of failure. Its victims were spread over a vast expanse of territory through a long course of years. In almost every case there had been just sufficient success attained to show that the conditions were favorable throughout the country for actual growing of the silkworm and their food. At the same time it was no less clearly shown that there was an insurmountable obstacle to the profitable prosecution of the business.

As early as the middle of the 17th century silk culture in Virginia was reported as "moderately thriving." Haudkerchiefs, dresses, waistcoats, and even a royal robe for Charles II were, it is said, made in the colonies of native grown silk. In 1732 the industry was started in Georgia, and 27 years later 10,000 lbs. of raw silk were shipped from Savannah to England, where it commanded a better price than any other. South Carolina commenced it about the same time, and in 1755 it was begun in Connecticut—the first mulberry plantation having been started on Long Island. In 1767 the delusion that silk growing was a good thing to do penetrated Pennsylvania, and a few years later to New Jersey, New York, and even to the New England States as far north as Maine. Everywhere the result was the same; the interesting experiment proved to be a financial failure. Yet people kept on struggling with it. In 1810 the three counties of Connecticut in which the industry was then most flourishing—that is, New London, Windham and Tolland—produced sewing and raw silk of the value of \$28,503, and fabrics from the refuse silk worth half as much more, and still it was a failure.

After a while State legislatures strove to encourage silk culture; Congress gave it favorable notice; the Secretary of the Treasury published a high book about it; men of wealth, theorists and experimenters mounted and rode it as a hobby; and finally the endeavors of speculative energy and misplaced ingenuity culminated in the memorable *morus multicaulis* mania of 1838-9. The frenzy was wide spread, and almost paralleled the tulip mania of Holland. Everybody was going to get rich in sericulture. Suddenly the bubble burst; thousands of persons were ruined; and the hueless of silk growing got a set-back from which it has never recovered. Still there are obstinate people scattered all over the country who try to carry on the business in defiance of the sharp lessons of experience. A devoted Frenchman in Kansas has sunk a fortune in it; thousands of dollars have been spent in the effort to force it in California; and in nearly every State there are small experiments going on constantly. Only a few days ago a large silk manufacturer in New England received a letter from a man out West saying that he had 3,000 cocoons for sale, and wanted to know how many cents each they were worth. They were worth to that manufacturer only a few cents a pound, and were not worth writing a letter for.

The one insurmountable obstacle in the way of profitable sericulture in this country, to which reference has been made, and one which it is scarcely to be hoped can ever cease to exist here, is the impossibility of procuring intelligent, skilled labor at prices such as are paid in China, Japan, Turkey, Italy and France.

The production of the cocoon is a very simple matter; but the utilization of it is a difficult and expensive one. In 1,000 ounces of cocoons there are only 150 ounces of pure silk, and of that quantity only 80 to 100 are fit for reeling. It is in that process of reeling that the value of the silk is established, for it is an exceedingly delicate, slow and painstaking art, on which depends the evenness of the thread, which is the great desideratum. The cocoons are thrown into warm gum, which makes their filaments adhere. If the water is too hot it partly dissolves the silk; if hard, it makes the silk liable to break. Six, eight or ten filaments, each as thin as a thread of an spider's web, are deftly unwound by the reeler from as many cocoons. The gum they bear causes them to adhere. The same number must be kept together all the time. When one breaks, or the available part of a cocoon is exhausted, another must be joined on so evenly that not even under a microscope is a roughness perceptible. The cocoons are never of the same size, their filaments varying from 1,300 to 3,000 yards in length, and the reeler must know just where to start and where to stop on each individual cocoon to turn out raw silk. And when he or she knows how to do all that, and is careful in doing it, and works faithfully, he or she may turn out one and a half or two lbs. of raw silk by a week's hard

labor, and, in doing so, will earn 15 or 20 cents per diem if working in France or Italy, half as much in Turkey, or one-third as much, or even less, in Japan or China.

It is no wonder, then, that a "filature"—the technical name for a filament unwinding establishment—cannot flourish in this country, where men and women capable of such work could not be got for less than \$1 per day. This labor must be not only skillful, but "dirt cheap" in order to be profitable. Nor will the cocoons, viewed as a crude crop, to be shipped abroad for reeling, pay for growing. That the results attained in this country have not been profitable, is clearly established by the fact that in 1876 it was computed that of 56,000,000 lbs. of silk, the product of all countries, only 16,000 lbs. were furnished by the United States, Mexico and Brazil together. And this is the result of 250 years of persistent endeavor to establish sericulture in this country. A business which requires such poorly paid labor to make it profitable is not adapted to the United States, and it seems like folly to attempt to force its growth.

VALUE OF THE DIAMOND DRILL.—Never, perhaps, in the history of the Comstock, has there been such extensive use of the diamond drill as within the past month. According to the Gold

General Albert J. Myer.

We present herewith an engraving of Gen. Albert J. Myer, Chief of the Signal Service Bureau, who died on the 24th ult. at Buffalo. Gen. Myer was known all over the country, although very few knew his face. He was better known as "Old Probabilities," a familiar cognomen applied to the official representative of the Signal Bureau. This distinguished officer was born at Newburg, in the State of New York, in 1828. He graduated at Hobart College, at Geneva, in that State, in 1847. After applying himself to the study of medicine, he took the degree of M. D. at the University of Buffalo in 1851; and in 1854 he was appointed Assistant Surgeon in the United States army. He served in the medical department until the breaking out of the civil war, when he was appointed Chief Signal officer. He continued in the service until the close of the war, and received the brevet rank of Lieutenant-Colonel, Colonel and Brigadier-General of Volunteers. In 1866 Gen. Myer was placed at the head of the Signal Service of the regular Army, and in 1870 he was charged with the taking of meteorological observations at the military posts and other points in the country. It was



THE LATE GEN. ALBERT J. MEYER, CHIEF OF THE SIGNAL SERVICE BUREAU.

Hill News, the lower levels of the Ophir and the Mexican have been thoroughly perforated, both east and west, by which means, it was informed by Supt. Patton, he had been enabled to discover the exact location of the water courses which flow through the formations along the lode. This was the chief value of the diamond drill. For example; it was of great importance sometimes to drill ahead when running drifts, and ascertain what danger existed of an influx of water. Floods in the mines were thus frequently avoided. Mr. Patton fortified his statement by citing the case of the Savage, where the inflow of hot water from the north drift of the 2200 level flooded that mine and the Hale & Norcross for four years. Had the body been first tapped by the diamond drill, that disastrous flood would have been avoided. Besides its great value in detecting the presence of water, the diamond drill has a certain use as a prospector. It is true it is not always trustworthy when a body or a streak of ore has been found, especially if the ore is soft. If a vein of chloride ore, narrow and soft and rich, is struck by the diamond drill, it will feed the boring for some distance, and so mislead by giving indications of a large body of milling ore. Still it is often useful in determining whether there is any ore in a given region worth drifting for. A new use of the diamond drill has recently been made in the Jacket and Overman, in which mines it has been sent down perpendicularly, to guard against water.

THE NOTORIOUS EMMA MINE.—This notorious mine, which has alike dissipated fortunes and reputations, is likely, according to the Salt Lake Tribune, to resume its old place among the rich mines of Utah Territory. The mine is now in better condition and fuller of promise than it has been at any time since the wrangling and counter-fighting over it first began.

largely owing to Gen. Myer's executive ability, scientific knowledge and capacity for mastering details that the Signal Service of the United States has succeeded in reaching its present condition of usefulness.

ELECTRIC LIGHTS IN A QUARTZ MILL.—We are informed by the Salt Lake Tribune of the 12th inst. that the Walker Bros. of that city have just entered into a contract with the agent of the Brush electric light for one of the largest-sized machines with 14 lights, with which they will illuminate their quartz mill at Walkerville, Montana. These lights will be disposed about the works as follows: seven will be used in the large mill, four in the small one, one in the hoisting works, and two will be placed so as to light the dumps. The illumination afforded by this number of lights will enable the men to work at night as well as in the daytime, while the expense will be less than that of ordinary light. It will be the first instance of the employment of the electric light in Montana.

STRIKES IN UTAH MINES.—During the past week, according to the Salt Lake Tribune of the 12th Sept., several highly important developments of ore have been made in the Bingham district, Salt Lake county. The strike of sulphuret ore in the Lucky Boy, in Black Jack gulch, is pronounced to be very interesting, and is likened to some of the Comstock ore. A short time before a similar class of ore was struck in the Northern Chief. In the Summit mine they have uncovered some remarkably fine carbonate ore; and in the Stewart No. 2 they have struck a good body of carbonate ore high in silver. The Prince of Wales Con. has completed the connection between tunnel and shaft, and a body of ore two ft. wide extends the entire distance.

No hope is entertained for the men in the mine at Seaham, England.

The Photophone—Sound Reproduced by Light.

"There is nothing new under the sun," said the wise man. The times have changed. Now everything is new, and novelty follows novelty. The growth of natural knowledge has broadened the field of investigation, and increased the number of trained specialists, and an answer to any special inquiry is almost certain to come from some part of the scientific domain. The latest thing—it is simply a marvel—in applied science is the discovery that "sounds can be produced by the action of a variable light from substances of all kinds when in the form of their diaphragms." In other words, the ray of light is substituted for the connecting wire, and sounds produced at one station are reproduced at another. It is well known that the action of the telephone is due to variations in an electric current, caused by a diaphragm set in vibration by the voice, the current thus modified reproducing its vibration on a sensitive diaphragm at the other end of the circuit. In the photophone, as the new instrument is called, the changes in the electric current are made during its passage through the metal selenium. This curious metal was discovered by Berzelius in 1817, and by him named selenium. It is not known to occur native, although several native compounds of it are known. In its modifications it is both a conductor and a non-conductor of electricity. A steady light allows a current to pass through an even resistance; a varying light varies the resistance; so that the current is stronger or weaker after passing through the selenium, and in a telephone its vibrations are easily turned into vibrations of sound. The inventors have already conversed between points about 600 ft. apart, and they believe that a similar result can be obtained as far as a beam of light can be flashed. The simplest apparatus yet devised consists of a plane mirror of flexible material—such as silvered microscope glass or mica—which will quiver with the vibrations of sound. On this surface is collected through a lens a beam of light from any source, good success having been obtained from a kerosene or candle flame. The parallel beam reflected from the plane mirror is thrown to a distant concave mirror and focused on a piece of selenium, electrically connected with a telephone. The voice throws the plane mirror into vibrations, which modify in intensity the ray of light, which rapidly changes the resistance of the distant selenium, thus varying the electric current in the telephone as the voice now does directly. Another means of affecting the beam of light is by a disk, perforated with elits, which is rapidly turned, producing in the selenium a continuous musical tone, whose pitch varies with the rapidity of the disk's rotation, a silent motion thus producing a sound. A strange thing is that some substances placed in the beam of light do not cut off the sound. A sheet of hard rubber, for instance, made the beam invisible, but the musical note was still heard. Other experiments suggest the possibility of doing entirely without the electric current in the telephone at the receiving station. Many other substances were substituted for selenium, the affected ray of light focused upon them, and the musical note was heard without the aid of a telephone or battery. Only carbon and thin glass failed to give a sound.

Some minor details of the difficulties encountered and overcome in using selenium in the apparatus for speaking from a distance, are of interest. A small bar of selenium has a resistance to electricity equivalent to that offered by a telegraph wire long enough to reach from the earth to the sun. Even the cold light of the moon lessens this resistance, and such a brilliant light as that of burning magnesium wire halves it. But Ball and Sumner had to work long to reduce this resistance within manageable limits. No selenium crystal was ever known to measure less than 250,000 ohms of resistance in the dark. They have made cells measuring only 300 ohms in the dark and 155 ohms in the light, by melting selenium to brass conductors, a chemical union being formed which lessens the resistance at the point of contact of the two substances. Their 50 forms of apparatus are based on one of two principles—either to control the source of light, or to modify the beam itself, the second being the most practical.

The inventors of the photophone are Prof. Alexander Graham Bell, the acknowledged inventor of the telephone, and Mr. Sumner Tainter, of Watertown, Mass. The paper describing this invention was read by Prof. Bell before the American Association for the Advancement of Science, and was illustrated by diagrams projected on a screen, and by working apparatus. The interesting paper is described as a model of precise statement and scientific accuracy.

The latest excitement in the quartz line in Sierra county is the striking of some very rich quartz in the Forest Queen mine, near the mouth of Slug canyon, Downieville. About a week ago a small seam was struck, and in running some five ft. the ledge widened out to nearly four ft. wide. Several tests made lately ranged from \$20 to \$100 per ton.

STATE ENGINEER HALL returned to Sacramento lately from a visit to the scene of the debris work on the Yuba and Bear rivers. He reports the work as progressively finely.

[From Vera Cruz to Mexico.

After an absence of 22 years I revisited Vera Cruz. This little oriental city, hid away at the farther end of the Gulf of Mexico, is, in itself, not unattractive. Oriental I call it, for it is of Moorish descent, and its lineage is visible in its cupolas of white, rose-color and blue, overtopped here and there by Christian spires; in its houses painted bright red, yellow or blue; in its flat terraces, with their pyramidal ornaments. Cities are more enduring than men, and Vera Cruz has become young again, with its dwellings newly painted, its white bell-towers, its enameled cupolas, its new houses and monuments. There is a holiday air about it, and a faint Haussmann breeze has come across the Atlantic. The plaza, which, when I last saw it, was paved with angular stones, covered with filth and cut up with muddy brooks, is now a delightful square, planted with palms and other trees, robed in verdure, and paved with marble. In the middle we see a handsome fountain, while all around it are fine *cafes*, stores, the cathedral, the municipal palace, and other structures that vie with one another in giving it a fit surrounding. In the daytime the air is cool in the plaza; in the evening long lines of promenaders and of pretty Mexican ladies fill the walks. It is like one vast greenhouse.

The train left at 11:30 P. M., and during the night we traversed one of the most picturesque portions of the route. At daybreak we reached the plateau of Orizaba, and the prospect was delightful. On all sides rose mountains tinged with the brightest colors by the rising sun. The volcano of Orizaba commanded them all with its snowy cone. We sped through coffee plantations and vast fields of tobacco and bananas. We crossed ravines over venturesome iron bridges, meeting a fresh surprise at every turn.

From Orizaba we ascended by an easy grade to Maltrata, and then the train drawn by two engines made ready to mount the famous Cumbres de Aculzingo. We were now in the temperate, we were soon to be in the cold zone. The route lies before us describing long *detours* and ascending heavy grades; our two locomotives, puffing and howling, and as it were exhausted, make their way amid the grandest scenery. In three hours we reach the plateau of the *tierra fria*.

In these three hours we made an ascent of 4,810 ft., that being the difference of elevation between Orizaba, which is 4,810 ft. above sea-level, and Esperanza, which is 9,620 ft. At the latter place we dined. Our route now lay over vast dusty plains like Arabian deserts. The *haciendas* were few and far between, while the stunted maize and the poor, sparse crops of wheat were evidence of the dryness of the soil. The region is deplorably bare of vegetation, but the bold lines of the mountains defining the horizon, the vastness of the plain, the peaks which here and there break its monotony, the dust-whirls seen rising on every side, give it a strange aspect, and impress upon it the character of stern desolation.

But the railway has changed the face of this plateau. We might almost say that here the railway is a foreign intruder (*s'y trouve depaysee*); and it more than any other cause has made the region a solitude. We see no more the long convoys of mules that used to wind their way from Vera Cruz to Mexico, the lumbering wagons, the *arrieros* in picturesque costumes; no longer do we hear the silver bells of the *madrinas* (bell-mares). The little huts along the roadside where the muleteers were wont to quench their thirst, and the great *corales*, or yards, in which the mules were shut up at night, have disappeared.

The railroad stretches toward the northwest, and after passing Huamantla skirts the volcano of La Malinche, leaves Puebla about 20 leagues on the left, then passing through Apizaco it enters the Llanos of Apam. There we are in the land of *pulque*, the headquarters for the production of the wine of Mexico. On all sides are plantations of maguey (agave), and at every station are wagons unloading casks of the liquor so much liked by the Indians. This not very inviting looking beverage in color resembles a strong decoction of orgeat and water. It is thick, viscid, stringy, and has a rather strong taste of leather. It is said to be wholesome, and one becomes accustomed to it. It is consumed in enormous quantities in Mexico.

We next come to La Palma and then to Otumba, famous for the victory won by Cortes. Finally, leaving on the right the pyramids of San Juan de Teotihuacan, we arrive in the capital.

Mexico has undergone a greater change even than Vera Cruz. The Grand plaza, which formerly was bare of vegetation, is now a fine park with eucalyptus trees 100 ft. in height, though planted hardly 12 years ago. Handsome houses, showing novel architectural forms, have sprung up everywhere; new quarters now occupy the place of demolished convents; pretty squares surprise the returning traveler at street crossings, and the magnificent promenade constructed by Maximilian, and which is to be extended as far as Chapultepec, would do honor to the proudest capital.

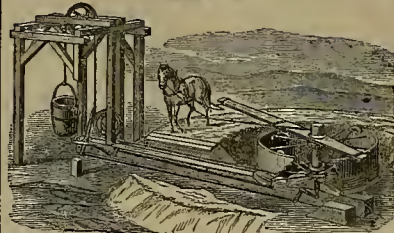
So, too, the toilets of the ladies and the costumes of the gentlemen are changed for the better, and are now more costly, perhaps, but they have lost in picturesqueness the nearer they have approached the fashions of Europe.—*M. Charnay, in North American Review.*

An iron church was sent from London for the Esquimaux in 1877, and after being two years on the way was erected last October. Eight Esquimaux have recently been baptized in it.

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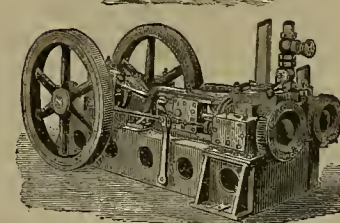


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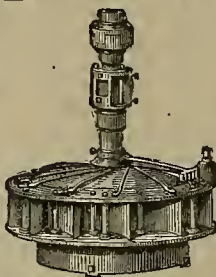
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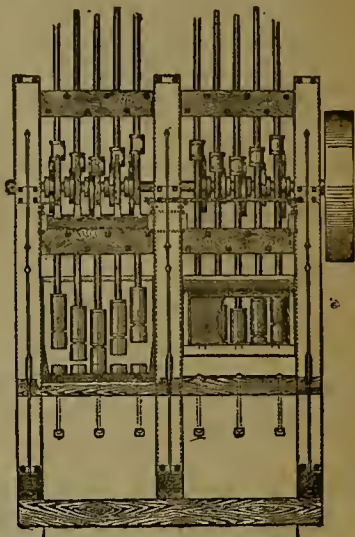
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231,900.—BENCH-PLANE.—A. P. J. Bossel, Virginia, Nev.
231,857.—SUBMARINE WALL.—D. A. Dyer, Ferndale, Cal.
232,044.—BUTTON.—L. Leszynsky, S. F.
231,907.—VALVE.—G. Milne and W. H. Gants, S. F.
232,056.—PICK.—C. Norton, Tuscara, Nev.
231,908.—FORMING DRAIN PIPE.—W. Hamlet, Merced, Cal.

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Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

Brickell, et. al. vs. The City of New York.

U. S. Circuit Court, Southern District of New York. Decided October Term, 1879; Wheeler, J.
1. Letters Patent, No. 31,132, granted August 13, 1868, to Wm. A. Brickell, for an improvement in feed-water heaters for steam fire engines, construed and sustained.

2. Section 7 of the Act of 1880, which provides that every person or corporation may use and vend to others to be used, any specific machine, manufacture, or composition of matter which they have purchased, or constructed prior to the application for a patent, applies in cases of patents for substantive things to the particular things, so purchased or constructed only, and does not include the right to practice the invention without liability.

3. The patent involved in the case of McClurg vs. Kingsland, was for a method of casting iron rollers, and it is not probable that the decision rendered in that case would be followed beyond cases of the same statutory class.

4. By the Act of 1870, the right of a person constructing or purchasing a patentable article before the application for a patent is limited to the right to use or vend the specific thing, and this, whether it is regarded as a legislative construction of the former Act or not, may properly govern the right of recovery in actions brought since its passage.

5. For an infringement of a patent by its fire department, a city is liable.

Washburn and Moen Manufacturing Co. vs. Haish.—Barbed Fence Wire.

U. S. Circuit Court, Northern District of Illinois. Decided October 14, 1879. Blodgett, J.:

1. A person has no right to mark his goods with any words or terms indicating that they are manufactured under a patent which he does not own, and has no right to use.

2. A defendant, having so marked his goods, will not be allowed to defend himself by denying the validity of such patent.

An injunction will be issued restraining defendant, his agents, attorneys, servants and associates, from marking any barbed fence wire or packages of barbed fence wire, with any words or letters indicating that said wire is manufactured, either in whole or part, under, or pursuant to re-issued patent, No. 6,902.

Burton vs. The Town of Greenville.

U. S. Circuit Court, District of New Hampshire. Lowell, J.:

1. Letters Patent No. 10,497 granted to Geo. D. Burton, February 19, 1873, for a design for a street lamp declared invalid.

2. A design patent is invalid if the device embraced thereby was in public use or on sale more than two years before the date of the filing of the application on which such patent was granted.

St. Louis Stamping Co. vs. Quinby, et. al.

U. S. Circuit Court, Eastern District of Missouri. Decided March 16, 1880; Treat, J.:

If a few persons form themselves into a corporation under the Missouri Statutes, the business of which is the necessary infringement of a patent, they cannot escape individual liability for the acts done in the corporate name.

Statement of the case: The defendants were stockholders of a corporation. The infringement consisted in making and selling an article of manufacture. The complainant contended it was entitled to recover as damages; the defendants having made no profit, the profits it would have made on the articles sold by the defendant, and offered no other proof as to damages. It also contended that the defendants were liable jointly and severally for such damages. The master, in his report, negatived both of these propositions, to which action exception was taken.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

MAGAZINE FIRE-ARM.—George E. Williams, S. F. Patented Aug. 31, 1880. No. 231,390. The improvements shown in this fire-arm are more especially applicable to that class of guns in which the cartridge is received from the magazine into a carrier-block, and is elevated by this block to a level with the bore of the gun, and is then forced into its chamber in the barrel by a carrier-holt or breech-pin operated by a lever and suitable connecting-link or arms. This invention consists of a peculiarly slotted plate, formed with the breech-pin holt, and adapted to reciprocate the holt by the action of the guard lever. It also consists, in combination with the holt, of a hinged locking-block, which is connected with the guard-lever by links, and is thrown up by them to allow the holt to be retracted, and is drawn down so as to lock it firmly when it has been forced forward and the cartridges introduced to its chamber ready for firing.

HOISTING MACHINE BRAKE.—William R. Eckart and Hans C. Bahr, S. F. Patented, Aug. 31, 1880. No. 331,766. This invention relates to certain improvements in that class of machinery which is used for hoisting and lowering in mines and other places, but which is more especially adapted for heavy mining work; and it consists in a novel construction and operation of the friction brakes, by which the speed of the descending load is regulated, checked or stopped at will, said brakes being adapted to move on parallel lines, so that all parts of the faces of the brake-shoes will be approached to or retracted from the drum at an equal rate of speed.

BUTTON.—Lester Leszynsky, S. F. Patented Sept. 7, 1880. No. 232,044. This invention relates to an improvement in buttons and similar devices which are used for connecting portions of clothing or other articles together; and it consists of a stem, having two parts projecting from the button or head, in combination with a rubber or other elastic center, which is held between the button and the goods, and furnishes an elastic, non-wearing surface, which the button-hole surrounds.

PICK.—Corbin Norton, Tuscara, Nev. Patented Sept. 7, 1880. No. 232,056. This pick is especially useful for miners' purposes where the tools receive hard usage. The improvements consist in forming a head of malleable iron, cast with a socket for the pick-handle, and having a slot through which the pick itself is passed, the pick being secured in place by a key fitting into a central notch. No wedging of the handle is necessary to keep it in place, and neither pick nor handle is apt to get loose from the head.

STEAM BOILER.—John B. Ward, S. F. Patented Aug. 31, 1880. No. 231,874. This invention consists in certain details of construction, whereby perfect circulation of the water in the boiler is accomplished by the water being drawn from the colder portions of the boiler to that where greater heat is obtained. It also relates to a peculiar means by which the steam is dried and superheated while in the boiler so that the cylinder of the engine will receive dry steam direct from the boiler at each stroke of the piston.

PROCESS FOR PRESERVING MEAT IN THE CIRCASS.—Richard Jones, Berkeley, Gloucestershire, England. Patented, Aug. 31, 1880. No. 231,807. This process consists in utilizing the circulatory organs of the blood to equally distribute throughout the body a solution, and by this action to mingle the substances intimately with the blood, so that they permeate the whole body and coagulate with the blood in every part, and thoroughly preserve the meat without giving it a sodden appearance.

SCRAPER.—Assaria Rewrick and John D. Gilmore, S. F. Patented, Aug. 31, 1880. No. 231,850. The scraper is formed in a cup-shaped triangular form. It is made by means of a die in which it is struck up, in such a form as to give the greatest strength with a minimum of metal. By this construction the scraper can be kept sharp with but little grinding.

AFRICAN EXPLORERS KILLED.—Long before its exploration shall be achieved, Africa is likely to prove the graveyard of many of the most enterprising and brave men of the times. The London Standard, in commenting upon the sad news which had been received at Zanzibar of the murder of Capt. Carter and Mr. Cadenhead, remarks that it adds two more victims to the long list of those who have sacrificed their lives in the interest of African exploration. Hitherto disease and not violence has been the cause of the fatality which has overtaken so many of the explorers of the dark continent. From the facts which have reached us it would, however, appear that the gallant pioneers whose loss we have to deplore met their death at the hands of a chief named Wrambo. But, as the expedition which they commanded was, at the latest date, in the country of a roher king called Mercambo, not far from Lake Tanganyika, the name has, in all probability, been altered in telegraphing. Messrs. Carter and Cadenhead, though Englishmen, were employed under the auspices of the Belgian branch of the International Society for the exploration of Africa. The leading object of the expedition sent out under its auspices is not so much geographical discovery as the establishment of centers of civilizing influence and commerce at various points of the interior. The first of these stations was founded in August, 1879, by M. Cambier at Karama, on the eastern shore of Lake Tanganyika, 140 miles south of Ujiji. In December M. Cambier was joined by Messrs. Popelin and Carter with the Indian elephants, of which only one remained. Another reinforcement, constituting the fourth expedition, under Messrs. Burdo, Rogers and Cadenhead, was far on its way when last heard of, and was sanguine of soon communicating with Mr. Stanley. The latter, by the aid of steam launches, is endeavoring to ascend the Congo, which, amid so many perils, he descended three years ago. The introduction of elephants into African exploration was a great step in advance, and it was fondly believed that one of the chief difficulties in the path of travel had at last been overcome.

Tricks of Charlatany.

Some people seem inclined to break from the well-beaten paths of experience, which are illuminated by the steady light of science, and to grope about in the labyrinths of alchemy. It would appear that a modern Midas has just startled many of the good people of Calistoga from their propriety. A dispatch from there says that a man named Tichenor had that day in the "presence" of many of our citizens extracted the sum of \$14.35 in gold from a 5-gallon pail of water from a mineral spring in this neighborhood. Of course Midas Tichenor knew how the gold got into the water; but that is his "patented secret," and is only to be had for coined money. The extraction of the gold was the least difficulty of the prestidigitator; but it takes gold in some form to salt even spring water. After this last brilliant success we would suggest that the Calistoga Midas try his hand on—let us say, as giving the least promise of being gold-bearing—a common doughnut. We believe the other myth fits the case of this Midas, and that he would better don his Phrygian cap.

Since the above was written Mr. Henry G. Hanks, State Mineralogist, has visited the scene of Mr. Tichenor's operations, and proved the whole thing a humbug. In conversation with Mr. Hanks he stated to the writer that he should have paid no attention to the matter had he not received letters from the East and inquiries from here, relative to the "golden water." When he became convinced that people were really thinking of investing he went to Calistoga. He took demijohns and filled them with this alleged gold-bearing water and sent them to the city. He then interviewed Mr. Tichenor, that gentleman being reluctant to divulge his "secret," giving as a reason that he had not secured his patent and did not want to lose "his rights." He tried to exact a promise from Mr. Hanks that he would not divulge what he saw, a request very properly refused. With reluctance he proceeded to show how he got the gold out in the presence of Mr. Hanks and several others. Among other things he took a bottle from a closet, and poured in a couple of ounces of what Mr. Hanks supposed was chloride of gold. Mr. Hanks asked to see the bottle, as this reaction which took place in the liquid assured him that chloride of gold had been introduced. Mr. Tichenor refused to allow him to see the bottle or its contents, whereupon Mr. Hanks told him that he was using chloride of gold, and that his "process" was a humbug, or words to that effect.

On his return to this city Mr. Hanks made a careful analysis of the mineral water, although convinced there was no gold in it, and the analysis bore out his convictions.

Tahoe—Origin and Meaning of the Term

EDITORS PRESS:—Prof. John LeConte, in his article on the "Lakes of the Sierra Nevada," published in the Press of the 11th inst., in speaking of the origin and meaning of the name now borne by Lake Tahoe, remarks that it is supposed to be of Indian derivation, and to signify, in the Washoe dialect, "big water," or, according to other interpretations, "deep water," etc. In this supposition Prof. LeConte is correct, as the following facts tend to show: Visiting the "eastern slope" in the summer of 1859, I employed one of the head men of the Washoe tribe to accompany me on a visit to this sheet of water, then known as Lake Bigler—a name given to it, I think, a short time before by a party sent out during the gubernatorial administration of John Bigler to survey a wagon route over the Sierra Nevada. Inquiring of my guide the Indian name for this water, he told me that they called it "Tah-hoe-ee," meaning big lake or water.

In some remarks on that section of country published at the time, but in what paper I cannot now recollect, I made mention of this fact, which then, no doubt, for the first time appeared in print, and thus attained to general publicity. How and why the term came afterwards to be adopted, superseding the several names by which the lake had previously been known, is in the above article sufficiently accounted for by Prof. LeConte.

The foregoing is the correct and only meaning of the word in the Washoe language, and the above is a true version of the time and manner in which it came to be applied to this lake. As used by the Washoe it is a word of three syllables, with the chief accent on the last, as set forth above; and since it is likely to be retained in our geographical vocabulary, I suggest that we adopt this pronunciation, as being more analogous to the Indian tongue and likely to work a uniformity in the popular method of pronunciation, which now vibrates between "Tay-hoe," "Tah-hoe" and "Ta-hoe."

HENRY DEGROOT.

Discovery of a Submarine Plateau.

The officers of the Coast Survey announce the discovery of a submarine plateau under the Gulf stream off Charleston. The existence of this plateau has not been thought of; and yet it must exert an important influence on the Gulf stream temperature as well as on the climate of our southern seaboard.

In running a line of deep-sea dredgings off Charleston, Commander Bartlett was recently surprised to find in the axis of the great stream depths of from 233 to 450 fathoms only, where it was thought they would range from 600 to 1,000 fathoms. This "swell of land" rising from the Atlantic bottom was found stretching eastward 150 miles between the parallels of 32 and 32½ degrees, at the northeastern terminus of which the depth of water suddenly increased from about 450 to 1,386 fathoms.

The submerged ridge projecting from the Carolina coast must obviously serve as a fender or bar to deflect from our southern seaboard the underflow of arctic water coming from Newfoundland, and by forcing the glacial stream far to the eastward, it thus allows the great "river in the sea" to retain its tropical heat, unreduced by commixture with the polar undercurrent, all the way from the Gulf to Charleston. This inference from the recent coast survey soundings is confirmed by the temperatures of the Gulf stream on the Admiralty chart, which shows a decided cooling of the stream after it passes north of Charleston, and also, what is more remarkable, that in September (when the ocean is at its warmest) the stream is warmer between Charleston and the Florida channel than it is even in the Gulf itself. The peculiar topography of the Atlantic bottom off the Carolina coast, it would seem, explains also the fact, which has lately excited much surprise, that the immense June flow of ice-bearing water from Newfoundland made no impression on the temperature of the southern seaboard. The summer of 1875, like that of 1880, opened with an exceptionally large number of icebergs moving off the coast southward; but, contrary to popular opinion, these ice masses and the swollen polar stream that bore them had no effect in lowering the air temperatures from Nantucket to Florida. Could the icy water have surged up against the shore, a different result would have been felt. We may, therefore, conclude that not only off Charleston, but possibly of Cape Cod also, there exists a submarine barrier projecting out into the Atlantic, intercepting the volume of heavy glacial water moving southwestward over the sea bed, and thus securing throughout summer the extraordinarily high temperature of 80°, which is observed in the western edge of the Gulf stream all the way from Cape Hatteras up to Nantucket shoals.

As these invisible features of the ocean floor off our coasts have an important bearing on the sea temperature and climate of the numerous seaside resorts from Cape Cod to Cape Hatteras, their accurate exploration is of growing interest and should be made complete.—New York Herald.

"THE CALIFORNIAN" FOR OCTOBER.—That rising popular monthly, *The Californian*, is making rapid strides toward perfection. The October issue, just received, is one of the most interesting ever published. Among the papers specially worthy of remark we notice the opening article, by Mr. W. W. Crene, Jr., who is now traveling in Europe, giving the first installment of the experiences of "A Winter in Berlin." Henry D. Wolfe has been "Cruising in a Chinese Man-of-War," and tells of the strange sights he saw. Mr. W. C. Morrow's thrilling story, "A Strange Confession," is continued, and grows in interest. Prof. E. R. Sill, of the University, under the title, "A Private Letter," reads us a telling lecture on our daily speech. John Murray has a discriminating criticism on John G. Whittier; Philip G. Galpin contributes a memorial on Gov. Haight; Capt. Edward Field relates "Some Incidents of the Seven Days;" Henry S. Brooks gives "A Scrap of Frontier History;" Marie Howland has an able account of "Education in Japan;" Alexander Del Mar formulates the railroad side of the controversy with the State; and a writer who signs himself "Lorelle," hints whom we suspect to be a well-known contributor, looks into the future, and, in a semi-humorous way, prophesies the result of Chinese immigration in the year 2080. Short stories are supplied by Sallie R. Heath and Mary W. Glascock, and some good poetry is contributed by Charlotte Perry, Seddie E. Anderson and Charles H. Shinn. The usual departments are added, and the number, as a whole, is very complete and satisfactory, and fully the peer of any magazine published. Our readers should bear in mind that by sending their yearly subscriptions to the *Californian* (202 Sansome St., San Francisco) before the first of the coming month, October, they can get it for \$3 instead of \$4. Don't delay, but send your subscription at once.

MRS. ATKINSON is succeeded in the superintendency of the Massachusetts State prison for women by Dr. Eliza M. Mosher, formerly physician of the prison and deemed capable of administering its affairs successfully.

News in Brief.

LARGE forest fires are reported southeast of Salt Lake City.

It is stated that Chilo has accepted the mediation of the United States.

A STEAMER from Baltimore for Liverpool lost 225 head of cattle on the passage.

THE Chinese portion of Auburn, Placer county, has been destroyed by fire.

GENERALS STEWART and Roberts have received the grand cross of the Order of the Bath.

A BERLIN dispatch says that Prince Bismarck has abandoned the project of a bi-metallic system.

MAIL service has been ordered on the new railroad between Bath Mountain and Austin, Nev.

AN electric light of 10,000 candle power now adorns the front of the Madison Square theater, N. Y.

A HUMAN skeleton was recently found near Hood river lodged in a tree 15 ft. from the ground.

PHILADELPHIA is to have a new club, composed of the amateur artists and musicians of the city.

THE Mexican troops are to immediately recommence the campaign against Victorio's band of Apaches.

A MEMBER of the Guards' Club, London, has been expelled for brutally beating one of the house servants.

THREE THOUSAND Smiths, alleged descendants of a man who lived 150 years ago, met recently in New Jersey.

THE London and Northwestern railroad was lately discovered to be mined with dynamite and gunpowder.

THE Emperor of Germany and his entire Court will visit Cologne, Oct. 15th, to officially open the cathedral.

THE mail bags on the Pecos mail line were rifled on Thursday night, Sept. 9th, near Anton Chico, New Mexico.

A FIRE in Saint Beat, Haute Caronne, Sept. 10th, has destroyed 32 houses and rendered hundreds of people homeless.

A DISPATCH from Rome, Sept. 10th, says a stream of lava is issuing from Mt. Vesuvius, near the new railway to the crater.

THE winter wheat crop of Illinois is 53,865,000 bushels, valued at \$44,457,000. Over 46,000,000 bushels are to be shipped.

OWING to tobacco worms and damaging rains, the tobacco crop in portions of Virginia will be the smallest known for many years.

It is said that fish recently caught in the Columbia river branded with letters were put in the Atlantic by an Eastern hatchery.

THE belief that the evacuation of Candahar would be the abandonment of all the fruits of war, has now become universal in India.

L. COLNATH and George M. Scott have been appointed Commissioners for Utah for the great world's exhibition in New York, in 1883.

LUCY TAPPAN, a graduate of Vassar and the Massachusetts normal school, takes the chair of mathematics at Lasell seminary, Auburndale.

THE stone lighthouse on the first point of Tanging-Koeling, on the west coast of Java, has been thrown down by a violent earthquake.

THE Irish Royal College of Surgeons has lately severely cautioned its members against having any communication with homeopaths.

A TRAIN from Waterloo station, London, for Hampton Court, came in collision with an engine. Four persons were killed and 30 injured.

HERR GERHARD ROHLFS, the explorer, is going to Abyssinia as a diplomat. He is charged by the Emperor William with a mission to King John.

MARTINEZ, a leader of the recent revolution in Sonora, has been arrested by a deputy United States Marshal for violating the neutrality laws.

M. GAMBETTA speaks very fast in public. Most men pronounce but about 180 words a minute, but M. Gambetta talks at the rate of 235 a minute.

WHENEVER members of the Chinese Embassy appear in the streets of New York they are hooted at and pelted with stones by the Gotham "hoodlums."

A MINER, whose name could not be ascertained, fell through a snow-bridge into Panther creek, in Washington Territory, on the 9th instant and was drowned.

A WOMAN in Root Co., Nev., the wife of a Justice of the Peace, the other day made the wedding cake for a couple her husband married, dressed the bride, and gave birth to twins.

A DISPATCH from St. Johns (N. F.), of Sept. 10th, says the British steamer *Anglia*, from Boston to London, foundered at sea, four days out on the 6th. All saved. Vessel and cargo lost.

A NEWLY married couple of Portland, Maine, were at a neighboring island the other day, when the husband played croquet with other young women. The bride fired a revolver at him, and he ran away and has not been seen since.

A POET, named Sarragin, finding fame did not come to him quickly enough, determined to make it. He has just astonished the city of Lyons by entering a cage of lions and reading one of his poems.

DR. O. W. HOLMES once perpetrated a pun in relation to the rival claims of the late Dr. Jackson and another physician to the discovery of anesthetics. He proposed that a single monument be erected to both jointly, on which should be inscribed: "Here's to ether."

By Universal Accord,

ATER'S CATHARTIC PILLS are the best of all purgatives for family use. They are the product of long, laborious and successful chemical investigation, and their extensive use, by physicians in their practice, and by all civilized nations, proves them the best and most effectual purgative Pill that medical science can devise. Being purely vegetable, no harm can arise from their use. In intrinsic value and curative powers no other Pills can be compared with them, and every person, knowing their virtues, will employ them, when needed. They keep the system in perfect order, and maintain in healthy action the whole machinery of life. Mild, searching and effectual, they are specially adapted to the needs of the digestive apparatus, derangements of which they prevent and cure, if timely taken. They are the best and safest physic to employ for children and weakened constitutions, where a mild but effectual cathartic is required.

FOR SALE BY ALL DEALERS.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove, walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

BOUND VOLUMES OF THE PRESS.—We have new sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and either binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by seeing it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

J. G. COLMERNEL is requested to report to this office. He went to Humboldt County, Cal., about May 4th, 1880. His Agency for this paper has been revoked for good and sufficient reasons. Mr. C. is a heavy set man, of dark complexion, weighing some 175 pounds, or more.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

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Chew JACKSON'S BEST Sweet Navy Tobacco.

FRUITS AND VEGETABLES.

(WHOLESALE.)

WEDNESDAY M., Sept. 15, 1880.	
FRUIT MARKET.	
Apples, basket, 40	75
do, box, 30	1 25
Apricots, bx., 100	1 00
Bananas, bunch, 25	4 00
Blackberries, chst., 25	5 00
Cherry Plums, bx., 30	40
Chromes, Cal. box, 100	—
Cocoanuts 100	7 00
Crab Apples, bx., 50	60
Figs, black, bx., 50	1 00
Grapes, Sweetwater, 50	75
Muscats, 50	90
Rose Peru, bx., 60	75
Wk Hamburg, 50	45
Tekey, 100	1 25
Limes, Mex., 100	2 00
do, Cal. box, 1 75	2 25
do, large box, 5 00	7 00
Lemons, Cal. bx., 3 00	3 50
Sticky, box, 8 00	9 00
Australian, 4 50	6 00
Nectarines, box, 1 00	1 50
Oranges, Cal. bx., 3 75	4 25
do, Tabiti, 30	35
do, Mexican, 40	—
Peaches, bx & bsk., 40	1 50
Pears, basket, 40	60
do, Bartlett, 50	75
Pineapples, doz., 6 00	7 50
Plums, bx., 50	1 00
Prunes, German, 75	1 25
Quinces, 1 00	1 25
Raspberries, ch., 10	20
Strawberries, ch., 10	20
Sugar Cane, bbls., 2 50	—
DRIED FRUIT.	
Apples, sliced, 7	8
do, quartered, 8	6
Apricots, 17	20
Blackberries, 23	24
Chromes, 23	24
Dates, 9	10
Figs, pressed, 7	8
do, loose, 4	6
Peaches, 10	—
VEGETABLES.	
Asparagus, bx., 100	1 25
Beets, ch., 100	1 00
Beans, String, 1	—
do, large box, 5 00	7 00
Cabbages, 100	60
Cantaloupes, crt., 25	50
Carrots, sk., 50	75
Cauliflower, doz., 40	75
Chile Potatoes, 40	50
do, Bell, 40	50
Cucumbers, box, 25	35
do, Mexican, 40	75
Egg Plants, bx., 10	13
Garlic, New, lb., 4	5
Green Corn, doz., 10	13
Green Peas, lb., 2	3
Lettuce, doz., 10	—
Mushrooms, lb., 10	—
Parasels, lb., 1	—
Horse radish, 10	—
Rhubarb, bx., 60	60
Squash, Marrow, 8 00	10 00
Summer box, 8	25
Tomato, box, 35	60
do, Sacramento, 35	60
Stockton, 35	60
Turnips, oil, 50	60
White, 50	60
Watermelons, 3 00	7 00

RETAIL GROCERIES, ETC.

WEDNESDAY M., Sept. 15, 1880.

Butter, California	25	45
Chocolates, 13	30	45
Chocote, 13	30	45
Eastern, 13	30	45
Lard, Cal., 18	20	25
do, Eastern, 20	25	30
Flour, ex fam, bbls	12	00
do, Meal, lb., 12	00	13
Sugar, wh. arabid	12	13
Light Brown, 8	8	9
Coffee, Green, 23	35	40
Tea, Fine Black, 50	40	50
do, Japan, 65	00	60
Candles, Adm't's, 15	25	30
Soap Cal., 7	10	10
Rice, 8	10	12
Yeast Pwd., doz., 1	50	60
do, Cal. Oysters, doz., 2	00	30
Syrup S F Gold'n, 75	01	02
Dried Apples, lb., 10	14	14
Ger. Prunes, 12	10	10
Figs, Cal., 11	10	11
do, 9	10	11
Oils, Kerosene, 50	60	60
Wines, Old Port, 3	50	50
French Claret, 1	00	20
Cal. do, 3	00	20
Whisky, C K, gal, 3	50	50
French Brandy, 4	00	80

METALS.

(WHOLESALE.)

WEDNESDAY M., Sept. 15, 1880.

IRON.	
American Pig, soft, ton, 42	00
do, 33	00
American White Pig, ton, 28	00
Oregon Pig, ton, 28	00
Refined Bar, 41	00
Horse Shoes, keg, 7	00
Nail Rod, 8	00
Norway, according to thickness, 8	00
STEEL.	
English Cast, B., 16	00
Black Diamond, ordinary sizes, 13	00
Drill, 9	00
Flat Bar, 16	00
Flow Steel, 9	00
COPPER.	
Ingot, 32	00
Sheeting, 33	00
Sheeting, Tinned 14x48, 42	00
Nails, 38	00
Bolts, 38	00
Old, 38	00
Brazers, in all sizes, 38	00
Precipitate, 100 fine, 19	00
LEAD.	
Pig, 8	00
Bar, 8	00
Pipe, 8	00
Shot, Discount 10% on 500 Bgs., 1	00
Drop, per bag, 1	00
Buck, 2	50
Chilled, 2	75
TIN PLATES.	
10x14 I C Charcoal, 10	50
10x14 I C Coke, 10	50
Banca Tin, 10	50
Australian, 10	50
I C Charcoal, Roofing 14x20, 21	50
20x28, 21	50
ZINC.	
By the Oak, 8	10
Zinc Sheet 7x13 ft. 7 to 10, lb. less than cast, 10	00
NAILS.	
Assorted sizes, 8	50

LEATHER.

(WHOLESALE.)

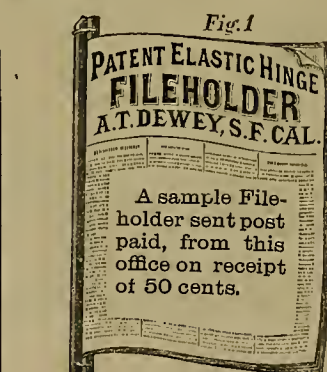
WEDNESDAY M., Sept. 15, 1880.

Sols Leather, heavy, lb., 30	00
Light, 25	00
Jodot, 8 to 10 Kil, doz., 36	00
11 to 13 Kil, 50	00
14 to 15 Kil, 50	00
Second Choice, 11 to 13 Kil, 40	00
Simon Ulme, Females, 12 to 13 Kil, 52	00
14 to 15 Kil, 61	00
16 to 17 Kil, 67	00
Simon, 15 Kil, 61	00
20 Kil, 65	00
24 Kil, 70	00
Kips, French, lb., 1	00
Cal. doz., 43	00
French Sheep, all colors, 12	00
Eastern Calf for Backs, lb., 1	00
Sheep Roans for Topping, all colors, doz., 9	00
For Linings, 6	00
Cal. Russian Sheep Linings, 3	00
Boat Legs, French Calf, pair, 4	50
Good French Calf, 4	00
Best Jodot Calf, 4	75
Leather, Harness, B., 35	40
Fair Bridle, doz., 45	00
Skirting, B., 33	37
Web, doz., 30	00
Leather, 17	00
Wax Side, 19	00

LUMBER.

WEDNESDAY M., Sept. 15, 1880.

CARGO PRICES OF REDWOOD.	
REDWOOD.	
Rough, M., 14	18 00
Surface, 24	00
Rustic, 24	00
do, No. 2, 18	00
Flooring, 18	00
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Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,

SAN FRANCISCO, SEPTEMBER 10, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, dividend (No. 35) of Fifty (50) Cents per share, was declared payable on WEDNESDAY, September 15th, 1880. Transfer books closed until Thursday, September 10th, 1880.

WILLIAM WILLIS, Secretary.
Office—Room No. 29 Nevada Block, No. 301 Montgomery street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, Room 37, S. F., September 15th, 1880.

At a meeting of the Board of Directors of the above named Company held this day, a Dividend (No. 55) of Fifty (50) Cents per share was declared, payable on MONDAY, the 20th day of September, 1880. Transfer books closed until the 21st instant.

W. W. TRAYLOR, Secretary.

Gover Mining and Milling Company—

Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 43), levied on the Eleventh day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Am't.
Ellis, H. C.	290	250	\$ 50 00
Hulme, Eliza J.	245	500	100 00
James, James	65	33	12 00
James, Frederick	381	62	12 40
McAfee, Wm.	200	500	100 00
McAfee, Wm.	201	600	100 00
McAfee, Wm.	202	190	38 00
Miller, W. J., Trustee.	243	1750	350 00
Miller, Eliza J.	391	600	100 00
Morgan, W. S., Trustee.	380	1000	200 00
Morgan, W. S., Trustee.	387	1000	200 00
Morgan, W. S., Trustee.	388	2000	400 00
Oates, Wm.	67	100	20 00
Oates, John	68	125	25 00
Ream, Charles	72	50	10 00
Ream, Charles	73	50	10 00
Ream, Charles	74	50	10 00
Sanborn, F. G.	335	250	50 00
Skinner, Maria	334	250	50 00

And in accordance with law, and on order of

Iron and Machine Works.

THOS. PENDERGAST.

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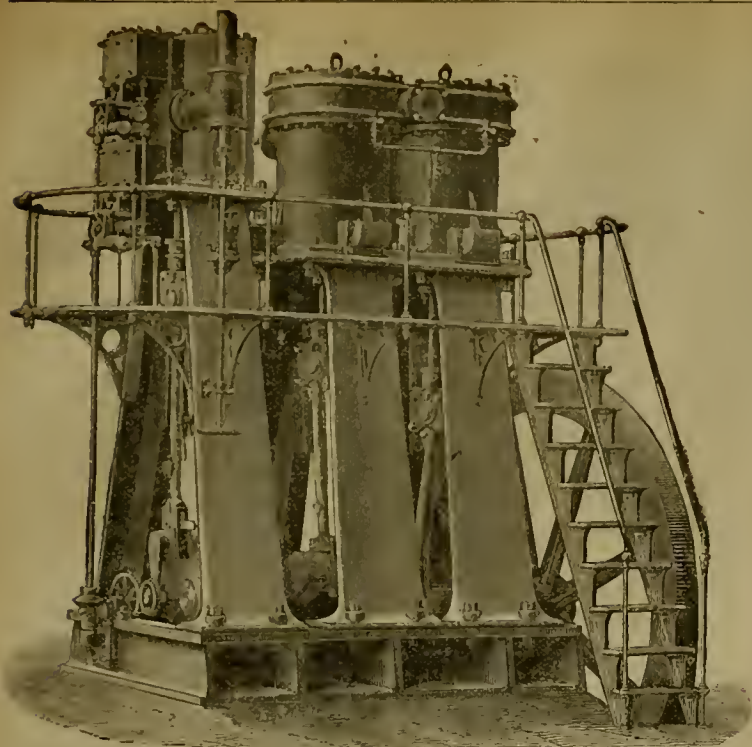
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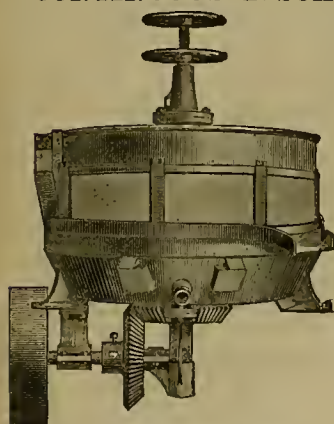
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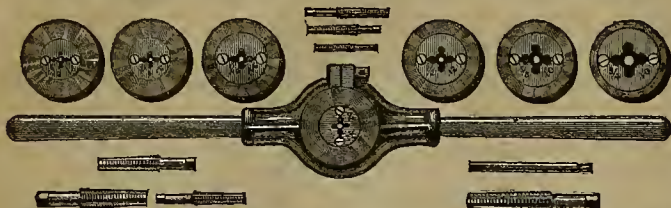
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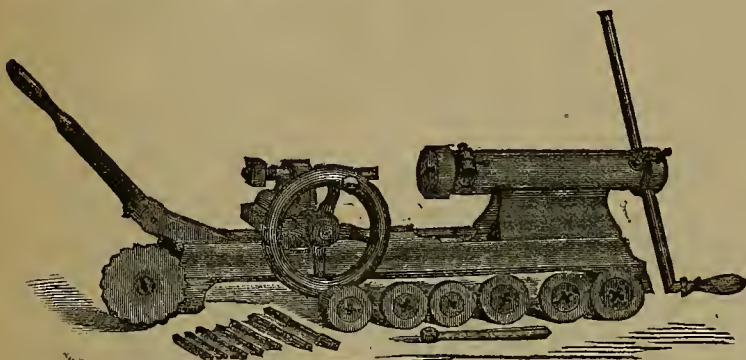
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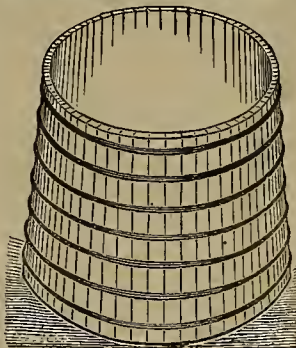
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The Wheelock Variable Cut-off Engine.

The mechanical industries of this coast are peculiar. They are not extensive yet, except in mining machinery and steam engines, but so far as gone, there is about them a broadness and boldness that has excited comment in other parts of the world.

The construction of machinery here is an "engineering" business as distinguished from a manufacturing one. There are more designs made and more mechanical draftsmen in San Francisco than will be found among ten times the "industrial" population in the Eastern States; and there are various works where orders will be taken alike for mining machinery, marine engines, locomotives, sugar mills or machine tools, and the work is carried out, too, in accordance with modern practice, including the best European as well as American precedents.

Situated as we are several thousand miles from analogous operations in the Eastern States, our engineers draw upon a wider field, and except Philadelphia, and there too, perhaps, there is no place in this country where the progress of engineering work in Europe is so closely watched as in San Francisco.

One thing we have been a little tardy in, however, that is, the highest economy of steam using. There have been no want of skill or knowledge of all data relating to the subject, but there has been a dread of the "refinements" in mechanism which the most improved steam engine involve.

The matter has recently been taken up, however, and the chances are that our engineers will not only attain as much as their Eastern or European competitors, but in the end, as in some other things, add bold improvements to astonish our slower-moving friends.

These remarks we make preliminary to some notice of the "Wheelock engine," illustrated in our present number. The engine has been engraved from a modification made at the Pacific Iron Works in this city, and, forestalling our reader's opinion, we think it a very creditable reproduction of this well-known engine.

The Wheelock engine, as many of our readers will remember, was exhibited at Paris in 1878, and in competition with some of the highest types of both European and American manufacture, carried off the chief honors, for economy, ease of action and simplicity of its valve gear.

The chief peculiarity of this engine, as contrasted with others having oscillating valves, is that they are in effect balanced, being supported on trunnions or spindle, that relieve the valve seats from undue pressure and permit a movement almost devoid of friction.

We are well aware of the failures in many attempts to "suspend" valves; that is, to keep them off their seats in so far as steam pressure on the back, but now that 10 years of duty in various parts of the world has proved the practicability of the "Wheelock" method there is nothing left but to take the fact for granted.

Moreover, it must be remembered that even in case of failure of the concentricity of the supporting stems the valves are then left in the same condition as in common slide valve en-

gines or the common type with oscillating valves.

We will not, however, enter upon the mechanism of the valve gear or the valves farther than to mention that the cut-off is an independent valve. These are matters of detail, problems of good-fitting and honest workmanship.

The Corliss engine has demonstrated since 1856 or thereabout, that variable valve gear could be made sufficiently durable and reliable to meet the requirements of ordinary use. The whole engineering world has followed this, an American idea, in steam, until the practicability, as before remarked, is no longer a question.

Referring further to the engine shown, Messrs. Rankin and Brayton, after very careful investigation, selected this valve movement as the one, in their opinion, best suited to the purposes of this coast, and by having added considerable strength to various parts of the engine, have carried out a design which does them and our

New Manufacturing Agencies.

The Pacific Coast Agency of the celebrated Knowles pumps, has within a few weeks been transferred to Messrs. Parke & Lacy, dealers in mining machinery, Nos. 21 and 23 Fremont St. They will now carry a full line of these pumps in stock, from the largest mining pump to the smallest made. This firm has also received this month the agency of another important manufacturing establishment, that of Scott Broe, engineers, wire drawers and manufacturers of improved steel and iron wire ropes for deep shafts, inclines, mines, shipping, telegraph wire, etc. Messrs. Scott Broe make a special patent steel wire cable for underground haulage, street railroads, conveyance of heavy loads, and all purposes where transmission of power is

Defective Safeties.

Another mining accident; nine men were killed; cause, defective safeties. How many times has this been chronicled, and how many times will it still be repeated? On this occasion the occurrence was at the Imperial mine, as detailed elsewhere in this issue, the cage being precipitated down the shaft with its living freight. The cause of the accident is only surmised, but the fact is apparent, upon examination of the guides, that the safety clutches on the cage did not catch once from the time the cable broke, although the foreman reports that they were in good condition. The *Enterprise* says it is thought that the falling cable coiled upon the top of the cage in some such way as to prevent the springs of the safeties from acting. Be this as it may, the safeties evidently did not work at all for some reason, as there are no marks upon the guides such as would be made had the cage stopped and then been forced down by the weight of the cable falling upon the bonnet. The blacksmith at the works, who is considered one of the very best on the Comstock, says he is positive that the safeties on the upper cage were all right, and he is unable to account for their failing to catch, if indeed they did fail. The springs attached to the safeties are of spiral-coiled wire, but stiff enough to hold a man's weight, and would surely move the eccentric if not interfered with, or in some way overcome. He says he has also used the usual steel springs, oiled like a watch spring, but prefers these now in use at the mine.

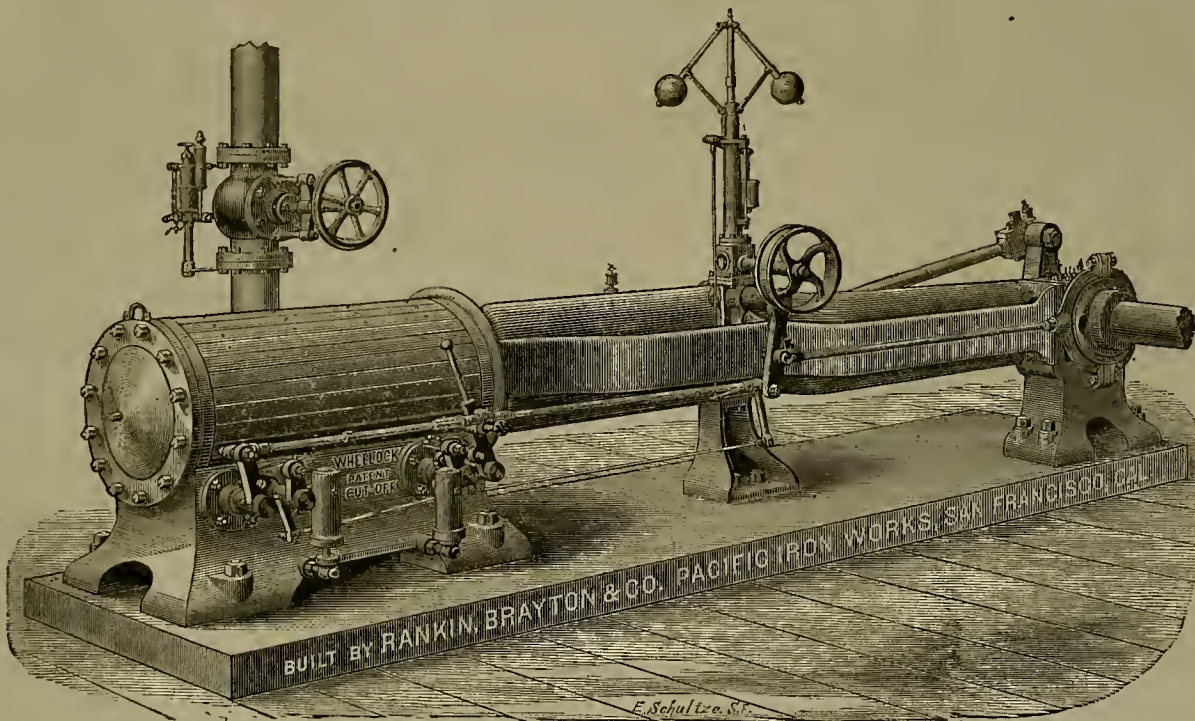
The truth of the matter is, that upon the action of a spring men's lives should not be made to depend. Springs cannot always be depended on by any

means, as this and many other instances prove. There are other mechanical appliances of more positive action than springs, which ought to be used on these cages.

The cable was nearly new, having been but about three months in use—of the best steel wire, and English make, four and one half inches by one-half. It was considered the best in the works, and had never been used to raise rock. It was also ascertained at the works that only last week the pitman of a pump, weighing from 2,500 to 3,000 lbs., had been safely lowered by it. The broken ends of the cable show the strands to be in good condition, only a few exhibiting signs of crystallization. It was considered perfectly safe, and the parting can be accounted for in no other way than by a sudden strain. It is strange, too, that it broke near the reel, in the portion least used.

ALL the Paris papers agree in advocating a pacific foreign policy. Some journals demand the Chamber to be summoned for a special session; but it is impossible. They will not meet before the usual time. It is announced that as soon as the new Cabinet is definitely constituted, a circular of a very pacific character will be dispatched to the representatives of France abroad. It is announced that Gambetta will shortly deliver a pacific speech.

Edison will soon have another test of his electric light.



THE WHEELLOCK VARIABLE CUT-OFF ENGINE.

San Francisco establishments credit. We are always glad to note whatever indicates progress in our mechanical industry, and the adoption of variable cut-off gear is certainly in the line of such progress.

It is easy to see a time, Mr. Isherwood to the contrary notwithstanding, when the expansive principle will be carried to its fullest extent in stationary, as it is in marine engines.

The high cost and scarcity of fuel on this coast will, in the end, as we have before indicated, no doubt lead to a great economy in steam using. It must do so, and there is at this time connected with the subject no matter of more importance than expansion.

We except, of course, economic evaporation and boiler plant, but between the two we must attain a duty of two pounds of coal per horsepower per hour before the problem can be called exhausted. The makers inform us that in a large cotton mill in Georgia a Wheelock engine is approximating this, and if so, we must accept it as an evidence of great merit in both steam making and steam using appliances.

The engraving was taken from an engine constructed for the Boston & Arizona Co. mill recently erected at Contention City, Arizona, the cylinder 20 inches in diameter, with stroke of 42 inches.

THE master weavers of north and northwest Lancashire have resolved to run but three days a week.

effected by means of endless traveling wire cables. The wire for this rope is manufactured by special patent process, has a very high direct breaking strain, and a hard tempered skin.

The firm make very large quantities of wire rope for mining purposes. One of their latest jobs is in the Cymmer colliery, Rhondda valley, Glamorganshire. Here there are two shafts, one of which turns out 1,500 tons a day and the other 800 tons a day. The drums for the hoisting ropes are respectively 11 ft. and 16 ft. and 6 inches in diameter, the hoisting ropes being of patent plow steel wire, supplied by Scott Broe. The underground haulage is on the endless rope principle, single walks, slow speed, comprising all the latest improvements. Scott Broe manufacture galvanized iron and steel rope for rigging purposes in large quantities. Their rope took the only prize medal at the Havre Maritime-International exhibition in 1868, since which time they have introduced many improvements. Messrs. Parke & Lacy will very shortly have on hand a very large and complete stock of this English rope for ships' rigging, flat rope for mining, hoisting, hauling rope, etc.

THE five big bridges of the Texas and Pacific railroad at the end of the track, 122 miles from Dallas, were finished on the 21st and trains ran beyond Palo Pinto canyon. Immense quantities of construction material are now passing to the front.

Certain Parasitic Plants.

[Written for the PRESS by W. G. KLEW.]

The process by which plants obtain their aerial food, and by which, in the leaf, carbonic acid is decomposed into its two constituents, solid carbon and oxygen gas, is termed assimilation. This wonderful power so wisely given plants, is not extended to all of them; it is only to those that contain leaf-green (or, as it is called, chlorophyll) that it is given, and then only under the influence of light. Plants that contain chlorophyll are not necessarily of green appearance; covered with thick white down or waxy excretions, it is sometimes concealed, or the presence of a coloring matter prevents it from being seen. These, however, must be considered the exceptions, and as a general thing a plant that is not green, must be considered a suspicious character—that is, not able to make an honest living. They are, in fact, the robbers and thieves among plants. These so-called parasites are of two distinct kinds: 1. Those that live on decaying or diseased vegetation; 2. Those that take the already prepared life-sap as it flows and appropriate it for their tissue. Into the mystery of the first class, to which the well-known fungi belong, I shall not enter, but turn to those peculiar adaptations among higher plants that live on the hard-earned nourishment of their fellows.

As a general thing parasites are not green, but there exist, nevertheless, some; and as discovery in botany has advanced, there has become known a number of green half-parasitic plants, formerly thought to be independent, that are root-parasitic on other plants, though generally not all their lifetime. These then form the transition to the more reduced parasites. It is among the family of *Scrophulariaceae* that we naturally should find these plants, for closely allied to this we have the order *Orobanchaceae*, which consists of a large number of true parasitic plants. In Europe the *Euphrasia* (*E. Odontites*, Eyebright) has been considered dangerous to the rye, and another, *Rhinanthus* (*R. Cristagalli*, Yellowpattie), has been the plague of the barley. Here in America we have two conspicuous examples, the *Gerardia*, with its beautiful yellow flowers, and the *Castilleja*, a native of the Eastern States, as well as of this coast. Its name at the East is "painted cup," while it is generally known as the flame flower in California, where its bright scarlet flowers, surrounded with scarlet or yellow bracts, attracts everybody's attention.

In another quite different family we have the *Comandra* (the bastard toad-flax); also occurring in California. This has a yellowish-green color, and entire oval leaves, resembling considerably its arboreal relative, *Santalum*, of India and Australia. *Santalum* is not parasitic when quite young, and will grow for some time without support; besides this there are several other genera belonging to *Santaleaceae*, but the *Santalum album* is the most important, yielding the true sandalwood. Naturally related to the latter, we come to that of the mistletoe. These are old well-known plants. The European species, *Viscum album*, has from time immemorial played a part in the world. Not taking in consideration that its berries have furnished the bird-catcher's bird-lime, it has perhaps done more mischief than any other of its kind; for was it not by means of the mistletoe that the evil one, Loke, of the Scandinavian mythology, caused the best of the gods, Balder, the personified Kindness and Love, to be killed by his blind brother. Whether the custom prevalent in England to give the privilege of kissing under the mistletoe hovers at Christmas, the cause of less mischief, I shall leave to the fair sex to decide. The various genera of mistletoe, *Viscum phoradendron* and *Loranthus*, make forest trees as well as cultivated ones their victims. The seed is naturally carried by birds, to whose beak it sticks and is deposited in a crack by the bird trying to clean its beak; roots soon develop and penetrate deeply into the cambium and wood of the tree, soon forming as close and intricate a connection as if it were a branch of the tree itself. Once inserted this way, it is pretty hard to destroy without cutting off the branch and all. Here in California the mistletoe seems to prey mostly on oaks, chiefly on the white oak (*Quercus lobata*), which it often completely kills. It would be desirable to stay the spread of this evil by preventing it from seeding. In Australia occurs the genus *Loranthus*, that is a tree ornament, though a dangerous one, by its brilliant scarlet flowers.

Leaving the green parasites, we pass to the class of parasites that are destitute of chlorophyll, or leaf-green, and consequently only can live by drawing the elaborated sap from their hosts. I have mentioned before that closely allied to *Scrophulariaceae*, the family among which there was found a number of half-parasitic herbs, we find one of the largest orders of colored parasites, the *Orobanchaceae* or *broomrape* family. This is chiefly of the old world, but there is found several representatives of it here in the U. S. Of these the *Epiphegus* or beechdrops, a purplish-brown colored herb, is found on the root of the beech, and the cancer-root, of similar appearance, flourishes among the oak. The *aphyllon* (*Orobancha*) is found in the Eastern States, as well as here in California, where the species *A. Californicum* preys on the roots of the *Chemisa* or *Adenostoma fasciculatum*. It

is a brownish-purple fleshy plant, with scales on the roots, where it has attached itself; all further growth beyond the attachment ceases, and it is therefore found on the end of the roots. The flowers of this species are purple, with an agreeable perfume. Other species of similar aspect occur on other plants. Another family where colored parasites occur is that of *Ericaceae*, or the heath family. Among those found in America are the well-known pinedrops (*Pterospora*) and pinesap (*Schweinitzia*), in aspect resembling the members of the broomrape family, but distinguished by the typical heath flower. The Indian pipe or corpse plant (*Monotropa*) is of a delicate waxy white, and singular prominent in a dark, shady forest, where it is found on the roots of various trees. It is, however, in the mountains of California we find the most beautiful and remarkable of this family, the famous snow-plant, *Sarcodes sanguinea*. Unlike most of the parasites of the temperate zone, it is marked by a beautiful pink color, bordering on crimson, and when seen, as it often is, with the snow as background, or surrounded by snow, it is a sight not easily forgotten. The strong fleshy shaft shoots often up several ft. before reaching the surface. The bell-shaped, red, waxy flowers are often one-half inch long, each having a fringed bract at the base, and the huge raceme, that reminds some of a very large pink hyacinth, is often a ft. long. When taken away from its support undeveloped and placed in sand, it will unfold its flowers, but of course not live after all assimilated matter stored in the fleshy stalk has been consumed.

But another still more interesting in botanical respect is the *Pyrola aphylla*. *Pyrola* is the so-called winter-green, a genus of pretty evergreen shrubs. In the *Pyrola aphylla*, as the name indicates, the leaves are lost or rather transformed to scale-like units for the true office of leaves, and the plants, therefore, form parasitic attachments, linked closely to the bright winter-greens; it forms thus a true transition from these to the before-named parasites.

Under the head of parasites, with remnants of leaves in form of scales, there are still two families of parasitic plants of general interest—the first (*Cytisaceae*) worth mentioning, on account of the attractive appearance of its members, which nevertheless ought not to favor their introduction, as they are pernicious parasites that had better be left in their native country—southern Europe and north Africa. Well-known among these is the *Cytinus hypocistis*, parasitic on the *Cistus* or rock rose, as the name indicates. The second is the *Balanophora* or spathe-bearing parasites. They are close allies of the *Arum* family, which they resemble in many respects, but in that of not being provided with leaf-green. Unlike most parasites, we count its members among several of considerable usefulness, which somewhat justifies their peculiar mode of living.

The *Langsdorfia hypogaea* yields, in New Grenada, an abundance of wax that is manufactured into candles. In Bogota is the species there known as *Sipo*, utilized as a torch. In Java there is likewise derived a kind of wax from *Balanophora elongata*. Having now dwelt on the colored parasites, that though not provided with leaves capable of any assimilation, still in the form of bracts or scales show plain evidence of these, we step down still lower to certain plants, where, in the embryo, even there is scarcely any sign of leaves. I refer to the too well-known dodder; it is superfluous for me to dwell long on the description of these plants; their yellow tangles have too often discouraged many a farmer; seen it destroy his flax field or clover. Here in California the species infesting the clover has long ago found its way to the alfalfa field. Farmers cannot be warned too often for this seed, and as a little close examination of it will reveal the true nature of it, it is, as stated, destitute of catydoledon (seed leaves), a spirally-curved thread, with a few scattered, very minute, scales being all that is present, so that even in the embryo the peculiar aspect is foreshadowed of the mature plant. The danger of the dodder spreading is of course counteracted by the fact that the various species prey, as it seems, only on nearly related plants. There exist, however, Californian species that seems to prey on very different plants, for instance the live-oak (*Quercus agrifolia*), poison oak (*Rhus lobata*), groundsel tree, *Bachoris*, and might be liable to attack cultivated plants. The adaptability of the dodder species to all localities, from the salt marshes of the bay to the dry hills, seems to justify this apprehension, and it should, therefore, be pursued as a thief and robber that might be liable to attack you anytime.

In this connection I cannot pass a very curious and interesting case that I learnt the other day. The small white morning glory is a too well-known weed that threatens to be a pest in some places; many remedies have been tried, but short of picking every piece of root out nothing seem to be complete. An ingenious nurseryman hit upon the bright idea to employ the dodder as an exterminator of the morning glory, and according to his statement it did its work remarkably well, killing off its near relation very fast. If this species of dodder employed thus is not the same that preys on the clover tribe we shall after all have to take the robber as an ally; but if it is the same the remedy is a little too dangerous to be a safe one.

Demising the pernicious leafless yellow relative of the morning glory, we step down a step

*The dodder *Cuscuta* belongs to the family *Cuscutaceae*, a sub-order of the morning glory family *Convolvulaceae*.

still lower and leave behind roots, leaves and stems until we find but the flower left. Plants consisting of nothing save one solitary flower. These vegetable wonders constitute the family of *Rafflesiaceae*, and are chiefly natives of Asia, though some are found in Chile. They vary in size from very minute until in the tropical jungles of Sumatra and Borneo they reach the largest size of any other flower known. The largest of these giant flowers is the species *Rafflesia Arnoldii*, which was first discovered by Dr. Arnold, who as naturalist accompanied the Governor, Sir Stamford Raffles, in Sumatra, and he relates it as follows: "I had accidentally absented myself from the party, when a Malayan servant came running up to me and with expression of the greatest surprise cried out, 'Come with me, sir! Come along! A flower very large, very fine, very wonderful!' I followed him a hundred paces into the jungle, where he pointed out to me between the bushes near the ground the most remarkable flower. It was attached to a slender, hardly two fingers breadth, thick root. I loosened the flower with Malay's parang, and bore it to my tent. When I saw it first there was a swarm of flies around probably seeking to deposit their eggs, as it had all the smell of decaying meat.' This *Rafflesia* is parasitic upon a *Cissus*, a relation of the grapevine; it has a perigonium (set of floral leaves), with five large lobes, thick and fleshy, brick-colored, with white warts; at the base of the lobes of the floral leaves is a kind of rim, and inside are found the numerous stamens. The fruit of this plant is a globular berry, containing numerous small seeds. These are probably carried by large insects or birds and deposited in cracks in the vine; here in the damp atmosphere it soon develops and is completely enclosed, until, like a boil, it bursts through the bark and enfolds itself, reaching sometimes a diameter of 3 ft. and a weight of 15 lbs.

Taking the parasites as a class, they are of more than usual interest to the student of nature. They illustrate wonderfully the adaptation of organisms. Though so reduced in their form, they fall more or less naturally into the orders of plants, and proclaim thereby that they are developments of the same nature and conceived in the same spirit as other plants.

Berkley, Cal.

Tin Ore in Maine.

The most important development in mining which has taken place in the State of Maine is that of tin. The country has no lack of mines of gold, silver, copper, lead; but as regards tin the case is very different. For that valuable metal we are obliged to go abroad, chiefly to England; and so long as that country controls the market for tin there is little hope of our warring from her the larger traffic in tin plate. The development of tin mining at home to a degree sufficient to secure the practical independence of our vast industries employing tin and tinned iron would be worth much more to the country, indirectly if not directly, than any mine of gold or silver. Accordingly it may be safely said that the announcement of the discovery of extremely promising deposits of tin ore in Maine is likely to awaken a heartier interest throughout the country than any other mining reports from that land of mining hoome. If any one of Maine's mineral products fail, it is sincerely to be hoped that the failure will not be in tin.

Indications of tin were discovered in Maine some 10 years ago, but then it was the popular belief that Maine was not, nor ever could be, a mining State. Recent explorations in the town of Winslow, on the Kennebec, a few miles above the State capital, have discovered half a dozen metallic veins of rich tin ore, in a rock formation precisely like those in which tin is found in Cornwall, Germany and New South Wales.

As described by Prof. C. H. Hitchcock, the rock which encloses the tin ore of Winslow is a mica schist or killas, associated with somewhat calcareous layers, and adjacent to a hard quartzite band, called an *elvan* by miners. Thirty ft. width of vertical schists of killas show 12 granite veins from half of one inch to three inches width, crossed, occasionally, by stragglers. These veins are full of crystals of tin ore (cassiterite) with the associated minerals fluor spar, margarite, mispickel, heryl, lepidolite, etc. The mineral, geological and physical feature of the Winslow mine are, Prof. Hitchcock adds, "identical with those common to the stanniferous districts of Europe," and "the ore seems to be sufficiently abundant to remunerate quite extensive outlay for mining operations."

Prof. Forrest Shepherd described the mineralized belt at Winslow as from 30 to 40 or more ft. in width. In a shallow pit where it has been uncovered, five or more veins appear within a space of eight ft., a promise unequalled in any Cornwall or Saxony mine. And what is particularly encouraging, the Winslow deposits are, at the surface, equal in quality, Prof. Shepherd says, to the best in Cornwall, and in a series of veins most favorably situated, while in Cornwall and elsewhere the veins are rarely remunerative except at great depths.

A company has been formed to develop the Winslow mine and to extend the explorations for tin in other parts of the State. The prospect of success is, to say the least, very encouraging. Should the yield prove abundant a particularly favorable opportunity would seem to offer for the manufacture of tin plate in that State, owing to the abundance of suitable iron ore and the proximity of forests for supplying the charcoal required to smelt it. —Scientific American.

The Greatest Deposit of Iron Ore in the World.

[From Notes in Iron Age of the Lake Superior Meeting of American Mining Engineers.]

We have scarcely dispatched breakfast when we glide into the harbor of Escanaba, already the principal shipping port for iron on the lakes, and with the promise of a future which would warrant much more extravagant prediction than its citizens are disposed to make. To-day we are to see the mines of the Menominee range. We have heard of them with more or less interest, but have seen so much ore on our trip that most of us would willingly pass the Menominee district by and go on to Chicago. We are all tired and it rains. But from the first glimpse of one of these mines the lagging interest revives and becomes almost an excitement. We have questioned the propriety of calling some of the great openings of the Marquette and Negannee districts "mines," as they might with more propriety be called "ore quarries;" but what shall we call these Menominee openings? They are not even quarries. You strip off the surface, and beneath lie deposits of ore such as the eye of man hath not seen. We are amazed, astounded, confused. Some of us who are interested in Eastern mines even turn away disgusted; and what wonder, when we see miners working these vast deposits of steel ore with pick and shovel as easily as they would dig a cellar on a sand hill; when we see ore of unapproachable richness and purity loosened, loaded and put in cars for 25 cents a ton, including everything except the royalty of 50 cents. We have been impressed from the first; now we are appalled. I do not exaggerate in any respect the feelings of those who saw these mines for the first time on Tuesday, and who had enough acquaintance with the iron trade to understand the meaning of what they saw. "There is nothing like it in the world," says every one, and no one can intelligently question the statement that in this Menominee range, with its incalculable wealth of ore in sight and its unlimited possibilities of development, has been found the solution of the ore question for a longer time into the future than anyone now in the iron business has any occasion to look. Many will probably read these words with a smile. A week ago the writer would have smiled had he read them from the pen of another, but the smile would disappear could the reader see these things with his own eyes. Description cannot do justice to the subject, any more than it could to the Falls of Niagara. Even when we see the Falls we wonder how this mighty cataract is fed, and when the supply of water which pours over the precipice in never-diminishing volume will be exhausted. But our question is answered when we cross the great inland seas which are its unfailing fountains. So it is with Lake Superior iron ores. We see them steadily flowing into the port of Cleveland in increasing volume, and have allowed ourselves to be deluded by the mistaken predictions of such authorities as Mr. Bell, that they are drawn from pockets of known extent, and that the end of the supply can be predicted. When we go and look for ourselves we see that the supply is not a matter of years, but of centuries; that as yet we have but scratched the surface of a mineral wealth for which the world has no parallel, and that within two or three years at most, the abundance and cheapness of these ores will so reduce the cost of iron as to materially change the condition of national industrial development and international competition. If anyone doubts this, let him go and look, and his eyes will be opened. For the first time your correspondent appreciates the value of the Lake Superior ores as a factor in the problem of our iron development.

The Menominee range is the latest and grandest development of this wonderful country. In 1877, 10,405 tons of ore were shipped; in 1878, 94,245 tons; in 1879, 269,089 tons. This year there have already been shipped 375,000 tons, and before the close of navigation between 500,000 and 600,000 tons will have gone forward. Every lb. of this ore will make Bessemer iron. The average cost at all the mines will not exceed \$2 per ton on cars. In the furnace they will melt like snow. In one instance the ore costs 20 cents a ton at the surface, and with a total force of 60 men at work the mine yields 400 tons per day. Nothing is shipped which does not contain 55% of metallic ore or over. The 50% ore is piled near the workings in the expectation that in the event of a sudden demand it may be wanted. This production can be increased as rapidly as it may be needed, and there will soon be no room for foreign Bessemer ore in a market so abundantly supplied from Michigan and Wisconsin. The time is not far distant when this ore will be delivered at Cleveland at \$4 per ton, leaving the mining companies \$1 per ton profit. At this point the purest ore will meet the Connellsville coke, the finest metallurgical fuel in the world, and the pure magnesian limestones of the lake shores, than which there are no better. The rest may be guessed.

A FINE ART publisher in London announces a public competition of original designs for Christmas and New Year cards, similar to that recently held in this city. Fourteen prizes are offered, amounting altogether to the value of \$2,500, and the judges are Sir Coutts Lindsay, Mr. Boughton and Mr. Marks—all artists. The designs need not be appropriated to Christmas or the New Year only, but they must have some suitable sentiment expressed in words.

MECHANICAL PROGRESS.

Methods of Boiler Making.

The government has spent thousands of dollars in experiments to discover the cause of boiler explosions; and the boiler insurance companies have gathered and published a prodigious amount of valuable facts and opinions about the behavior of steam generators, under various peculiar circumstances, for the information of boiler makers and steam users. Experts have advanced and bolstered up by argument a number of plausible theories about explosions, each endeavoring to pull down the theories of the others. But what is the general result of all these investigations? In one respect they agree. The opinion is unanimous that a boiler constructed of poor materials and of poor workmanship is quite likely to give trouble, and is liable to cause a serious accident, even in charge of a competent engineer, while a boiler of good material and well made is virtually safe. A very large proportion of boiler owners will not engage competent and careful engineers to manage them; therefore, the efficiency and reliability of the boiler must, or should be assured in the shop where it is made. But it is not altogether owing to carelessness or lack of skill among boiler makers that so many weak and dangerous boilers are made and sold, and go into use where they are believed to be safe.

Competition in taking contracts leads to some extraneous risks. Almost any boiler maker will study to produce a good, reliable article for the price agreed upon, making suitable allowance for the cost of material and work of construction. Steam boilers can be made better and at less cost than they now are by improving methods of manufacture. Boiler shops, as a rule, are not remarkably progressive in adopting new machinery and methods for facilitating and improving their work. The workmen often resist attempts to introduce labor-saving devices into boiler shops, though, as graphically depicted by Chordal, in a late issue of the *American Machinist*, successful devices of that kind contribute to give more work and higher wages. Holes in boiler plates are usually punched, thereby weakening the plates 35% to 40%, while by drilling the holes from a third to a half of this loss can be obviated. But, by common methods, drilling is much more expensive than punching. What is needed is a machine capable of drilling several holes at once, and which will work automatically. Such a machine would be one of the most desirable equipments of a boiler shop. Steam, hydraulic and pneumatic riveting machines are in use, each proving efficient and economical, but most shops adhere to the slower and more expensive process of hand-riveting. Flanging machines have been built, but, so far as we can learn, none have yet come into regular use. The successful development of a flanging machine offers a promising field for mechanical labor and experiment. Machines for bending plates are everywhere in use, but some of them are slow in operation. A machine for cutting off stay bolts quickly and without injury would be a very desirable adjunct to a progressive boiler shop, but we believe none have been successfully constructed thus far in this country, though they are in use in England. Hoisting apparatus is generally neglected in boiler shops, though a few shops are properly fitted up with such appliances.

Happily, modern improvements in the manufacture of boiler plates and tubes are such that a better article can be furnished for the price formerly paid for common stock, thereby encouraging boiler makers to improve their methods of construction. We look to see substantial progress in this direction. The shops that are enterprising enough to adopt the most radical improvements are those that will do work the best and at the lowest prices with satisfactory profits. They will also, as a natural consequence, secure the heaviest orders.—*American Machinist*.

The Gases Contained in Blow-Holes in Steel.

During a discussion following the reading of a paper on the Jones method of compressing fluid steel, before the Institution of Mechanical Engineers, Mr. E. Windsor Richards, the well-known metallurgist of Messrs. Bolckow, Vaughan & Co., gave some facts gathered at the Eaton Steel Works. Experiments were made to ascertain the composition of the gases contained in blow-holes of steel ingots, and Herr Mueller's results were fully confirmed. A tank was made sufficiently large to contain an ingot, this tank having a stuffing-box at the bottom through which a drill could be introduced. The ingot to be experimented with was placed in the tank, the latter being filled with water, and a hole 2½ inches in diameter was then drilled up 4½ inches into the bottom of the ingot. This drilling resulted in the release of gases, and the gases so evolved were collected and analyzed by Mr. Stead, of Middlesbrough, when the composition was found to be as follows: Hydrogen, 78.6%; nitrogen, 20.4%; carbonic acid, 0.2%; and carbonic oxide, 0.8%. From the hole just mentioned no less than 18 cubic inches of these mixed gases were obtained. We may add that Mr. Richards exhibited photographs of ingots planed down in the middle to ascertain whether they were sound or

not. One had not been compressed with steam, a second had been subjected to 80 pounds, and a third to 130 pounds. From the fact that the latter contained bubbles, it followed that a higher pressure of steam was desirable. It was therefore concluded to use a boiler capable of sustaining 200 pounds per square inch. It is not stated what grade of metal was subjected to steam pressure. Experience at the Edgar Thompson works has shown that for ordinary rail steel 100 pounds per square inch is sufficient. In conclusion, we may state that the claims to priority by M. Considere, who experimented at Chalosseire, France, were again brought forward during the meeting, but it was shown that Mr. Jones anticipated him.

Reducing the Consumption of Coal.

Engineering theory and practice have for a long time plainly pointed to high steam pressures as one of the surest ways to economy of fuel. Twenty-five years ago our ocean steamers carried only 16-lb. pressure to the inch, and burned 5 to 6 lbs. of coal per hour per horsepower. To-day they are carrying 75-lb. pressure, and burning 2½ to 3 lbs. of coal per hour per horsepower. In 1840 the *Britannia*, one of the finest steamers of the Cunard line plying between America and England, burned 5,291 lbs. of coal for each ton of paying freight she carried, her speed, then considered fast, being 8½ knots per hour. In 1877 the *Britannic*, speed 15.6 knots per hour, burned only 551 lbs. of coal per ton of freight carried. Although our present steamers are making fast time and are very economical as compared with the earlier vessels, still it is a lamentable fact that on the largest and finest of them, furnished with all the latest improvements and best appliances to secure economy, worked by the most careful and intelligent engineers, we succeed in putting into our steam only about one-tenth of the heat realized in our boiler fire, the remaining nine-tenths of the heat being lost. Only in proportion as we make our steam hotter and expand it more, shall we economize in fuel. In this respect the voyage of the *Anthraxite* is designed by her owners, we presume, to be an eye-opener for steamboat owners, not only in this country but throughout the world. If a little bit of a boat like this, 84 ft. long, 16 ft. beam and 10 ft. deep, can carry its own coal and water across the Atlantic, with a pressure of 350 to 500 lbs. to the inch, and on one pound of coal per horsepower, the natural inference is that our great steamers, when fitted on the same system, will realize far better results. The change from three pounds of coal to one pound of coal per horsepower means a saving of two-thirds in the coal bill, which is always an enormous item in the expense of large boats.

FILES AND FILING.—The following information may be found useful to some of our readers. A new file should always be used with light pressure on the work until the needle-like points of the teeth are worn away; after this a much heavier pressure may be used with much less danger of breaking off the teeth at their base. Many new files are violently diminished of half their efficiency by a few careless strokes when first applied to the work. Do not use a file on the chilled and gritty skin of castings, or on a weld where borax or any vitreous fluxes have been employed—no file can endure such usage. Every filer should keep a worn file with which first to attack the rough, gritty, or oxidized surface of iron work, and thereby pave the way for more efficient work with his sharp files. A piece of gritty or chilled casting that would rapidly destroy the cutting qualities of a new file would produce scarcely any damaging effect to a worn one. In filing steel, better results can generally be obtained by using files of a grade not coarser than "2d cut," finer grades being employed according to the finish and delicacy of the work under manipulation. Users of files should always seek to discover the fitness or adaptability of cut and form of files specially suited to their work. No one should expect the best results from a file on brass or spelter which was intended for use on iron and steel. Care should be taken when purchasing files to see that the manufacturer furnishes full weight articles. This is always a desideratum, and especially in case re-cutting is desired. A full-weight file can be re-cut two or three times, while a light weight will hardly bear one re-cut and give satisfaction.

EUROPEAN IMPROVEMENTS IN ELECTRIC BATTERIES.—European journals note two recent improvements in electric batteries, one of which is a modification of the well-known Bunsen, due to M. Azapis. It is stated that he has succeeded in reducing the consumption of zinc and effecting greater constancy of the current by using a solution of cyanide of potassium, caustic potash, chloride of sodium or sal ammoniac, instead of the dilute sulphuric acid generally used in the zinc cell. The second battery referred to is that of Woebler, which is described as follows: A roll of sheet aluminum is placed in a round glass vessel containing very dilute hydrochloric acid or dilute caustic soda. Within this large roll of aluminum is placed a porous cell containing concentrated nitric acid and a smaller roll of aluminum. Each roll has a lug or projection, which is inserted into a circular cover of ebonite, and thus kept in place,

SCIENTIFIC PROGRESS.

New Minerals.

Pandermite, a new beracic mineral, is described by C. G. Warnford Lock, in the *Journal of the Society of Arts*. He says that, through its geographical position, abundance, cheapness of working and easy manipulation, it is certainly destined, in a great measure, to rule the markets of Europe. The new field lies on the Tubiar-seu, a small stream feeding the Rhynadus river, whose outlet is in the Sea of Marmora, near the port of Panderna, on the Asiatic shore. It occupies an area of 20 square miles, and the stratum has been found to be 45 ft. deep. As well as observed, the name of the mineral is derived from that of the port.

In regard to the present state of our knowledge of the (so claimed) new elements, which have of late been announced with such startling rapidity, Mr. Humpidge contributes to *London Nature* a communication which is condensed by the *Engineering and Mining Journal*, as follows:

Of *Davyum*, which was announced in July, 1877, by Sergius Kern, as a new metal belonging to the platinum group, the author thinks that the investigator failed to take the necessary precautions to get rid of iron and the platinum metals, or at least that he does not state the means he adopted to do so. He holds, therefore, that this alleged discovery may be safely ignored.

The numerous metals of the yttrium group that have been announced are more difficult to discriminate between, because of their close relationship.

He goes into considerable detail in analyzing the claims of these numerous announcements to recognition, and presents the present state of our knowledge of them in the following scheme, which shows their status at a glance:

NAME.	Symbol.	Atomic Weight.	Discoverer.
Scandium (doubtful).....	Sc = 45.....		Nilsen.
Yttrium.....	Y = 89.....		Bunsen.
* Phosphium.....	Pp = 111.....		Delafontaine
* Unnamed metal.....	Atomic wt. {		Soret.
* Thulium.....	undetermined {		Cleve.
* X of Soret.....	Atomic wt. {		Soret.
* Holmium.....	undetermined {		Cleve.
* Terbium.....	Tr = 177.....		Marignac.
* Samarium (doubtful).....	At. wt. und. {		Boisboudran
* Decipium (doubtful).....	Dp = 159.....		Delafontaine
* Y Beta.....	149.4.....		Marignac.
Y Alpha.....	156.7.....		Marignac.
Erbium.....	Er.....		Mosander.
Ytterbium.....	Yb = 172.....		Marignac.

(Phosphium, the unnamed metal of Soret, Thulium, X of Soret, Holmium, Samarium, Decipium, Y Beta and Erbium give distinct absorptive spectra.)

Two alleged discoveries by Dr. Lawrence Smith, one of an earth unnamed, in the gadolinite of North Carolina, and another, which he alleged to be identical with the X of Soret, are not recognized by the author.

Of *Norwegium* and *Vesbium*, Mr. Humpidge says that, for the present, the chemical world must suspend judgment, since up to the present time we are without confirmation of their existence.

We are, as will be observed from the above, gradually finding our way out of the labyrinth of conflicting and duplicated discoveries which have puzzled chemists so much for the past few years, and may reasonably expect to see in the near future the wheat separated from the chaff.

* t, i.—probably identical.

THE EARTH AS A CONDUCTOR.—In a paper on the earth as a conductor of electricity, Prof. Trowbridge, of Harvard, arrives at these conclusions: 1. Disturbances in telephonic circuits usually attributed to effects of induction are in general due to contiguous grounds of battery circuits. A return wire is the only way to obviate these disturbances. 2. The well-defined equipotential surfaces in the neighborhood of battery grounds shows the theoretical possibility of telegraphing across large bodies of water without the employment of a cable; and leads us to extend greatly the practical limit set by Steinheil. 3. Earth circuits have an intermittent character, with periods of maxima and minima, which may occur several times a minute during the entire day. This intermittent character is seldom absent.

AN ADJUSTABLE LENS.—Dr. Cuoco, of Paris, has invented a lens of variable focus, in which the pressure of transparent liquid is made to alter the curvature of the flat faces of a cylindrical cell of brass closed with thin glass discs; the pressure can be regulated by a manometer gauge to any required degree within the limits of working.

HIGHT OF THE AURORA BOREALIS.—Drs. De La Rue and Muller determine the height at which the aurora borealis has its greatest brilliancy at about 38 miles; at a height of 81 miles the light is pale and faint, and at 124 miles above the earth's surface no electric discharge can take place to produce the phenomenon.

IMPROVED ELECTRIC BATTERY.—M. Reynier has introduced a new battery which is claimed to possess twice the electro motive force of the ordinary Bunsen couple; a solution of caustic soda is substituted for nitric acid, and the "porous" cell is constructed of parchment paper.

A Trans-Neptunian Planet.

In the *American Journal of Science*, Mr. D. P. Todd, of the "Nautical Almanac" office, Washington, details the efforts made by him to discover a trans-Neptunian planet. In 1874 he began a speculative search for such a planet, the presence of which has been suspected by earlier astronomers of eminence, and in October, 1877, he reached the following as a result of his inquiry: The longitude at that time would be approximately 170°; mean distance from the sun, 52; period of evolution about the sun, 375 years; stellar magnitude, about 13, and inclination of orbit to elliptic, 1° 24'. The practical search with the 26-inch telescope at the Naval Observatory, begun on November 3, 1877, and ended March 6, 1878, was unsuccessful. It was necessarily confined to narrow limits, but it was thorough so far as it went. Being unsuccessful, Mr. Todd did not see any benefit in publishing the negative result. He adds, however: "The matter now assumes a very different aspect; the publication of a recent memoir 'On Comets and Ultra-Neptunian Planets,' by Prof. George Forbes, of Glasgow, assigns, by a method of investigation entirely independent of my own, a position to a possible trans-Neptunian planet which may be regarded as in exact coincidence with that which I have deduced. Should a careful and protracted search of the region adjacent to the indicated longitude prove unavailing, no more certain test of the existence of a trans-Neptunian planet admits of application within the next few years than that of telescopic search of a limited zone extending entirely around the heavens—a search which I have been hoping, for more than two years past, for an opportunity to undertake, but which I see no present prospect of realizing."

A NATIVE ALLOY OF SILVER AND COPPER.—S. B. Wright, M. E., of Detroit, in a letter to the *Engineering and Mining Journal*, reports the discovery of a native alloy of silver and copper, in mineral sent to the Detroit and Lake Superior Copper Co. to be smelted. In appearance after cutting, it bears a close resemblance to a light-colored brass, although on the surface it has the color of silver. Two samples, whose specific gravity were taken, gave respectively 9.9432 and 9.3300. In composition he found the percentage of silver to vary from 53% to 75%, the remainder being made up of copper, with traces of iron and sulphur. Under a strong magnifying glass, the samples show a perfectly homogeneous structure, no wave lines or anything to indicate a mechanical combination being visible. He also adds: "As I have never known or heard of such an alloy being found, I was at first extremely doubtful about it, and submitted samples to a Mr. Marsh, a chemist, formerly connected with these works, who corroborated my views." Mr. Wright hopes soon to be able to give further facts in regard to this interesting discovery.

THE ORIGIN OF THE DIAMOND.—M. J. A. Roorda Smit has in the *Archives Néerlandaises des Sciences Exactes* a paper on the diamond mines of South Africa. He states that the diamond is found in a primitive gangue of volcanic origin, the presence of a double carboniferous silicate being a characteristic of these mines, which he regards as extinct craters of volcanoes. His hypothesis is that the diamond is of Plutonic origin, formed at the expense of organic matter under the influence of great pressure and at a high temperature. The recent artificial production of the diamond appears to confirm this view. M. Meunier states in the *Comptes Rendus* that he has produced crystals of spinel, and he believes periclase and corundum, by the action of steam on the chloride of aluminium in presence of magnesium at a red heat.

WAVES OF COLD.—Mr. R. G. Jenkins, F. R. A. S., has attempted to show a very remarkable effect of the planet Venus upon the earth. Many years ago the present Astronomer Royal proved that the disturbing effect of this planet was so great that the earth was materially pulled out of its orbit. Mr. Jenkins shows that it is to this disturbing action we must look for an explanation of the cold waves, which occur, on an average, every eight years—as in 1829, 1837, 1845, 1855, 1863, 1871, 1879—and that for the next 40 years the temperature will be below the average, as it has during the last 40 years been above the average. In regard to high temperatures, he states that for the last 50 years a heat wave has been observed to pass over the earth every 12 years, nearly contemporaneous with the arrival of the planet Jupiter at its perihelion, and that we are on the eve of the next heat wave.

TELEPHONIC EFFECTS, according to M. Ader, result from the shock of magnetic bodies. He says that any mechanical action that disturbs the molecular condition of a magnet core develops, when the core suddenly regains equilibrium, an electric current capable of affecting the telephone.

ACTION OF OZONE ON SILVER.—Under the action of ozone, silver quickly assumes a coat of black oxide, but gold and platinum remain unaffected. Mercury is superficially oxidized by ozone.

MINING SUMMARY.

THE MANZANITA DITCH.—Work on the new ditch of the Manzanita mining company is being pushed ahead at various points with a force of about 60 men, mostly Chinese, and it is expected everything will be in readiness to turn water on by Nov. 10th. The ditch will be used to convey

THE race for the Lancaster cup was won by Dresden China, Eideweiss second, Schoolboy third.

* THE project of securing the *Great Eastern* to run between London, New Orleans and Galveston, to take our cotton and other products and bring back emigrants, is in a fair way of being fully established.

surplus water in winter from Deer creek, 1 mile below Scott's flat, to the Manzanita mine, in the northern outcrops of this valley, having a total length of 2 1/2 miles, dimensions will be 8 1/2 ft at the bottom, 2 1/2 ft at the top, and 2 1/2 ft deep. The cost of construction is estimated at a little less than \$10,000. The owners are building the upper end.

BEAR RIVER NEWS ITEMS.—The American copper mine, at Spencerille, is producing cement at the rate of 300 lbs a day. Freight received by rail at the Wheatland depot, during the past week, amounted to \$25,346. Freight forwarded from that station, \$21,097.84, of which \$9,000.00 was copper cement from the Spencerille copper mine. Shipments of potatoes were very small, only 4,705 lbs. Total freight to and from this station required some 30 cars during the week for its transportation.

WORK ON THE MAIN DITCH.—It is now expected that the South Yuba water and mining company will begin enlarging their main ditch about Oct. 1st. Among the repairs already begun on the line is the construction of a flume across the North Fork of Steep Hollow. This flume is to be 60 ft high, and between 700 and 900 ft in length. This job will not be completed till the latter part of the month, but in the meantime, the water will be run as usual through the old flume.

THE RIVER.—The Hartung & Hetherington, at Scott's flat, will this winter run a 500-ft tunnel, by which to work their gravel claim to better advantage. A number of good clean-ups have been made by them this season.

A LARGE shipment of bullion was brought down yesterday from the North Bullionfield hydraulic mine and sent to the bay through Wells, Fargo & Co.

It is expected that some Eastern capitalists will arrive here next month for the purpose of examining the Potol quartz mine on Gold flat with a view of purchasing it.

The South Yuba water and mining company, of New York, whose property is situated in Nevada and Placer counties, have just issued a very complete prospectus of their possessions.

YOT BAR.—The Bird's-eye Creek or English company is making good clean-ups in their claims at Brown's hill. They are fitting up their claims at Red Box, as they propose to operate there also next winter. The lumber for building flumes is already on the ground. The mines at Lowell and Henington hills are said to be looking well. The Swamp Angel will in a few days begin taking out gravel through their new tunnel.

A GOOD YIELD.—Saturday a clean-up was made from 4 tons of ore extracted from Ed. Moore's mine, on Little Deer creek, and \$40 a ton was realized in free gold. The sulphurates, of which there were a liberal quantity, will, it is believed, pay in the neighborhood of \$100 a ton.

THE CHIRONAX.—Thirty-eight tons of ore are on the dump at the Chironax lead, Canada hill, and a crushing will be made soon. The ore continues to look as well as it did last July, when a lot of it was milled and 6 tons paid \$150 a ton, the remainder averaging \$40.

A FINE BAR.—Herald, Sept. 18: An armed guard from the North Bullionfield mine, yesterday brought to town a gold bar for shipment to the bay. The value of the treasure would probably reach the sum of \$18,000 or \$19,000.

NEW MINING ENTERPRISE.—Grass Valley Union. The machinery of the Oakland mine ranch, on Allison ranch, on Wolf creek, is to be removed to the Penobscot mine, on Church ravine, just north of the Gold Hill mine, and a shaft sunk to the depth of 200 ft.

PLACER.

LAST CHANCE AND DEADWOOD.—*Cor. Argus*, Sept. 18: Last Chance and Deadwood, two old mining camps, formerly prosperous, but of late years generally regarded as being "played out," are beginning to show unmistakable signs of returning prosperity. In both camps a number of claims long since abandoned except by the representative, who was expected to make annual pilgrimages to their localities, are now being got in readiness for work. Some are already being worked. Bishop's hydraulic claim at Last Chance, has been blessed this season with a good run; yielding a rich reward. The Caledonia has been reported to be producing well. The El Dorado is paying out the just reward of energy and pluck. The El Dorado is running for the back or Morning Star channel, which they hope soon to reach. The Root Hog company will soon get their new tunnel into the channel, and it has cost the company about \$10,000. They know that as soon as they get into there they will get good pay; they could not work it heretofore owing to a lack of proper drainage. At Deadwood every claim being worked is paying, I believe, and paying well.

HUMBOLDT CANYON AND DAMASCUS.—The town of Damascus is now more prosperous than it has been for the past two or three years, from the fact that the mines are all paying better than for that period of time. In the immediate vicinity of Damascus all the mines are gravel drift mines and are paying quite well, generally, this season. Lower down the American river several quite extensive drifts are being prospected and worked. The Giant Gap gravel drift mine has a tunnel in over 800 ft, and are still pushing ahead. They expect to strike the main gravel lead in a few more hundred ft. The Union quartz mine, formerly known as the Pioneer, is being worked and good prospects have been found. This mine was worked many years ago when large quantities of gold were taken out, but it was thought all the paying rock had been taken out and the mine was shut down. No work has been done for a great many years. The Poole quartz mine is getting better all the time. The 5-stamp mill is to be enlarged by the addition of 10 more stamps. The last run made paid \$30 per ton above all expenses. A large number of new claims are taken and are being prospected. It is thought a quartz boom will soon be had over in Humboldt canyon.

PLUMAS.

POORMAN'S CREEK.—*Quincy National*, Sept. 18: The mining interests are on the boom. A remarkably rich strike was made on the head of Nelson last week; many claims were staked off, and the end is not yet. D. R. Thomas has cleaned up his lower claims for the season, and has had in his hands 200 pounds of the yellow stuff as the result. For the time he has run it has paid well. He has a good property here, and Poorman's will again boom up. This is the region to prospect in, and if done with system and energy, is sure to prove remunerative. This is my prophecy, though I am not a prospector and have no mines to sell. Wish I had. The Kellys are hopeful of developing good mines, and they deserve it.

QUARTZ MILLS.—Mr. E. A. Henth, who recently returned from below, informs us that he will soon put up 2 quartz crushers on his mine at Argentine. The mills are something new, "the Huntington quartz mill," and are said to be very successful. Henth thinks the 2 will crush from 24 to 30 tons of rock per day. The mills will soon be shipped, and put in running order as soon as possible.

SIERRA.

RICH STRIKE.—*Mountain Messenger*, Sept. 18: Some Portuguese have discovered very rich gravel claims at the junction of Spencer lake and head of the Middle fork, 15 miles northeast of Downville. Coarse gold is found in abundance, some nuggets being valued at from \$7 to \$10.

QUARTZ MILL.—The owners of the Forest Quartz mill, located at Downville, have contracted for and will soon have on the way here a quartz mill capable of crushing 20 tons of quartz per day. It is the intention of these gentlemen to have the work vigorously. The mill will be located at the lower end of Durgan flat and will be run by water.

NOTE.—Wallace & Co.'s hydraulic mine, located 2 1/2 miles above Downville at Sweetwater ranch on the North fork, has a good prospecting claim, which may yield well next season. Brown & Ward shipped them 200 ft of 12-inch pipe this week.

TRINITY.

COFFEE CREEK.—*Trinity Journal*, Sept. 18: From Mr. George Williams of Trinity Center we learn that the Nash Deep Gravel M. Co. has commenced operations on Coffee creek and are making things lively in that section. A number of men are at work on a trail to their mines and the machinery for a saw-mill, now at Carr's ranch, will be

packed in as soon as the trail is built. The company owns a large body of land, have plenty of water and prospects for gold and silver are said to be very promising.

NEW RIVER.—We occasionally hear faint rumors about work being done by the New River Hydraulic Co., who are digging a ditch and building a flume to Hawkins bar. As all their material and most of their workmen were brought by way of Eureka, we know but little about what they are doing.

TUOLUMNE.

WATER CO.—*Tuolumne Independent*, Sept. 15: A crew has gone up on the line of the Tuol. Co. Water Co.'s works to put the ditches in order, make the necessary fall repairs to flumes and reservoirs and to get out timber, etc.

A suspension bridge flume will be put in at Long camp, about 40 ft high and 80 ft long, at a place where it is difficult to keep supports from sliding out. They will get out the timber now, and put the bridge in place before the rains. A 400-ft boom will also be placed in the Strawberry reservoir to keep descending debris from injuring the dam.

NOTE. There will be a continuous run of water this year in the Tuolumne Co. Water Co.'s canals, as the supply is said to be abundant. While putting in the suspension bridge at Long camp, however, which may take a week, the water will have to be shut off.

NEVADA.

WASHOE DISTRICT.

OVERMAN.—The Virginia City *Enterprise*, Sept. 21st, contains the following statement: Winze from 1000 level has been extended 30 ft; total depth, 133 ft. Incline upraise has been extended 30 ft. Forman shaft has been sunk and timbered 20 ft; total depth, 1,420 ft. Have also put the standing lift-pump in and started it up.

CALADONIA.—Pumps have been run an average of 18 1/2 hours per day. Consumed 7 2/7 cords of wood per day. Forman shaft has been sunk and timbered 20 ft; total depth, 1,420 ft. Have put in the standing lift-pump and started it up.

SAVAGE.—We have retimbered and repaired 12 ft of the main shaft and 10 ft of the 10th station, and have advanced the northwest drift on 10th level a distance of 25 ft. Have pumped once each day from 3 1/2 to 4 hours.

C. N. S. SHAFT.—Have cut out the pump station on the 2400 level 5 1/2 feet deep and put in 6 sets of timbers. The coping stones are on the foundations for the pumping engine, and workmen are dressing them down.

EX-HUQUE.—No work has been done in the mine since the late accident in the shaft of the Con. Imperial.

G. & C. AND B. & S. SHAFT.—Have sunk and timbered the shaft during the past week 30 ft; total depth, 1,610 ft.

CON. IMPERIAL.—The crosscut east of the south winze station, 2310 level, is 41 ft; face in porphyry.

AURORA DISTRICT.

REAL DEL MONTE.—*Esmeralda Herald*, Sept. 11: During the past week all operations have been centered in the sinking of main shaft, which has been sunk and timbered a distance of 18 ft, making the present total depth 74 ft. There is no change to report in the character of ground passed through, the formation being very kindly.

A station set has been put in at the 750 level.

AURORA CON.—Work is progressing in a very satisfactory manner on this property, the tunnel having been advanced 22 ft during the past week, making a total of 67 ft. The formation in the last 14 ft run is hard country rock, with some vein matter and soft clay.

LYNCE.—Everything is looking fine in this mine, with better prospects every foot advanced. The incline is now down 50 ft, the ledge at the bottom 6 ft wide, pay rock all through. The present contract will probably be finished this week and another contract let, but only a small one, as Mr. Booker says that if the rock keeps improving as they descend, the mine will be present day a bonanza.

The ore taken out will apply pay for the mill and leave quite a little sack for the fortunate owners.

BRISTOL DISTRICT.

HUTCHINSON.—*Pioche Record*, Sept. 14: Owing to the making of a pump, the Bristol S. M. Co.'s mill had to hang stamps for a few days, but is again crushing and working through 14 tons of ore per day. All parties who have seen the mill in operation pronounce it the best and most complete construction of the kind they have seen.

The iron mine is steadily improving and shipping about 10 tons of ore per day. The refinery had to close down temporarily, owing to the want of pearlash, but has since been working again.

The hill-side furnace is still turning out bullion in large quantities; a great number of tons on the dump awaiting shipment, but owing to the scarcity of teams is accumulating very fast.

ONE.—*Pioche Record*, Sept. 11: This mine, the property of the Bristol company, is developing first rate. The men working in the back part of the old cave, where ore was first struck, have encountered a fine vein of ore. It is thought that there is a chain of ore caves at this point.

In the upraise, in a different portion of the mine, a large quantity of ore is being extracted. The Bristol company now has a large force of miners employed.

EUREKA DISTRICT.

PHENIX.—*Sentinel*, Sept. 12: The lessees of this mine are shipping ore, and have now some 20 tons on the dump. It is alongside of the K. K. Eureka Con. and Jackson mines, and this fact is greatly in favor of the mine.

BUNSTON.—*Esmeralda Herald*, Sept. 11: The mine is now taking out some very fine ore, if the sample we saw was an average. All the mining properties on the southeast side of Old Prospect are booming up, and considerable capital is backing the faith of the owners.

RICHMOND CON.—*London Mining Journal*, Aug. 28: The usual telegram from the mines at Eureka, Nevada, states that the week's run was \$90,000 from 1,180 tons of ore. During the week the refining produced 400 bars of the value of \$15,000. One day was lost through the fire. The manager reports that the winze sinking below the 200 from the cave is down 20 ft, the bottom of which is in ore. He has no doubt they will make a connection in ore from this winze to No. 15 chamber east. The 600, north from No. 14 chute, has been drifted 16 ft in ledge matter, with bunches of galena. The present end is in ledge matter, but not so much galena as there was; still, the indications are good for striking ore.

REY-DUNDERBERG.—The progress of the company's mining operations continues to be highly satisfactory. The temporary confusion incident to the fire at Eureka will account for the meager amount of work reported in the weekly telegram. The smelter selected by the company sails for America to-day.

GOLD MOUNTAIN DISTRICT.

GOOD PROSPECTS.—*Esmeralda Herald*, Sept. 11: Late advices from this district, situated about 20 miles from Lida valley, state that mining prospects are excellent. The State Line mine is situated in this district, and yields a lot of very rich free-milling ore containing nothing but gold. The Oriental is also a good property, the ore being gold and silver and the best going as high as \$800 to the ton. The Rattlesnake has gone down on the ledge to a depth of 78 ft. Vein 5 ft wide, and yields ore that will average \$80 per ton. With this showing there is but little room for doubt that they will have lively times at Gold Mountain in the near future.

LEWIS DISTRICT.

SALT.—*Silver State*, Sept. 25: Walter Schmidt, of the Desert Crystal Salt Works, is building a salt mill at Eattle Mountain, of a capacity of 15 tons a day. It is necessary that the salt should be ground for the roasting furnaces at the mills in Lewis district, and he is building the mill for their accommodation and to supply the market with table, dairy and meat salt.

LINGTON DISTRICT.

IMPORTANT DISCOVERY.—*Salt Lake Tribune*, Sept. 18: This new district, in White Pine county, Nev., is 250

miles southwest of Salt Lake City, and is attracting great attention. The region has been known for years, but it was difficult of access, and now that the Utah Southern Extension has been completed, it will be brought within reach of capital. The only outlet for the district is through Utah. The ore is a high-grade millable quartz, and the ledge, which is from 3 to 8 ft wide, will run from 60 to 1,500 ounces, silver, and some gold, per ton. Unlike the majority of the Nevada camps, Lexington district is heavily timbered, with abundance of water and feed for cattle.

PHILADELPHIA DISTRICT.

BELMONT.—*Belmont Courier*, Sept. 11th, contains this official letter: Will extract about 10 tons first-class ore the present week that will mill about \$100 per ton, and about 20 tons of \$80-ore. Ore stops above 500 level, on the north side of the Hogan upraise, are showing a very fair quantity of ore, and are being prospecting. There are at present are in drift going south from the top of the Hogan raise; also 150 ft south of Hogan raise, above No. 4 raise, where we have found what appears to be a fine body of ore, but cannot work either of those points to any advantage until we put in ore chutes and do some dead work, which I will do next week. Then I can increase the production of ore.

PIOCHE DISTRICT.

BULLIONVILLE EXTENSION.—*Pioche Record*, Sept. 11: There has been an extension of the Bullionville mine located by Dr. Nichols and J. C. Henderson & Co. A contract was let to sink a shaft 50 ft, and is down about 30 ft. The ground is soft and easily worked.

SILVER CANYON DISTRICT.

SALE.—*Hamilton News*, Sept. 16: Mr. W. B. Lawler, of Silver Canyon, last Friday consummated the sale of some valuable mines in that district to Dr. Brooks, for a prospecting and mining interest for the prospecting was \$20,000. The most promising of the series sold were the Sadie L. and Blue Bell mines. The Sadie L. is stripped for 700 ft, and an incline is sunk on the ore for a distance of 112 ft. The average of the ore body is 5 ft. The company is erecting a 10-stamp mill, with sufficient capacity for an increase of 10 more stamps, which will be completed in about 30 days. Silver Canyon has a business-like appearance, and is sure to make a good and substantial camp. There are about 60 men employed in the mines at present.

SPANISH BELT DISTRICT.

BARCELONA.—*Belmont Courier*, Sept. 11th, gives the last official letter: Since my last report we have made connection in north upraise with air shaft, but will take a few days to complete it; will be obliged to timber up so it will be in good order. I am stopping out good ore from north level and will ship as fast as possible to Eureka. North level shows a well-defined ledge 4 ft wide and very solid. Will push it ahead as fast as possible through a splendid body of pay ore.

TYBO DISTRICT.

BULLION.—*Belmont Courier*, Sept. 14: The output of bullion from Tybo for the month of August was something over \$19,700, one of the best monthly showings in the history of the mine.

WHITE PINE DISTRICT.

PROSPECTS.—*Eureka Sentinel*, Sept. 17: A gentleman who seems to be well posted on White Pine affairs, does not express himself very enthusiastically of the future boom in the Hamilton section of the county. He says there is considerable prospecting going on all around the mountain and Treasure hill, in the tunnels and everywhere. Should any strike be made, then would come life. As matters now move along, the Eberhardt mill is grinding away on tailings. Their supply will run out in about 3 months longer, and if the company cannot secure those belonging to the South Aurora mill, and there should be no ore to treat, the stamps would have to rust out. The old White Pines dig with a dogged determination, and if there is any bonanza in that section it must and will be shown up.

ARIZONA.

HARSHAW DISTRICT.—*Bullion*, Sept. 11: The boys on the Red Top ledge, the longest well-defined ledge in the district, are doing good work. On the Maryland a body of \$200 ore has been struck. The contract for the 60-ft shaft on the Silver Bill, in Washington camp, has been completed, and a new contract for 125 ft of sinking and drifting has been let. Work is progressing steadily on the Alta mine, the rich strike at 140 ft greatly encouraging the owners. Mr. E. C. Richardson, on Saturday last, let a contract for work on the Harshaw mine, one for shaft 100 ft deep, and another for a tunnel to cut the ledge. From the Nevada standpoint, the town of La Nora is a lively and prosperous place, quarrels and fights being almost of daily occurrence. But these alone do not make it a success, for in fact the place is improving rapidly in business and population, and has fine prospects ahead. The Harshaw smelters are rapidly approaching completion, and will be in full blast some time during the month of October. An accident occurred to the rock-breaker at the Harshaw mill, and it is temporarily laid up for repairs.

GLOBE DISTRICT.—*Silver Belt*, Sept. 11: We have authority for stating that M. A. Baldwin has procured a lease of the old Globe mine. A force of workmen is already at work. This mine has produced some excellent ore, but has been so mismanaged that it grew into disaster.

SILVER NUOGET.—We have been informed by good authority that the north shaft of this mine has cut the vein 60 ft below the first level, and that the same rich ore was found. This being some distance below the water level is conclusive evidence that the vein is permanent, and that the ore continues.

MACK MORRIS.—They have made important developments in the 100 level of this mine. The crosscut from the winze shaft cut the vein on the 100 level on Friday, and it shows a 4 ft thick of fine ore. From the crosscut, the ore leads east and west, and establishes the fact that the Mack Morris is a bonanza mine.

NOTE. The material which was wanted for the completion of the Townsend mill has all arrived, and it will soon be busy pounding ore. There are 300 tons of ore on the dump. It is expected that the Golden Eagle mill will be running by the 1st of October. They will commence to crush ore in the Isabella mill in a few weeks.

DOS CABEZAS MOUNTAIN.—*Cor.*, The *Esmeralda Herald*, Sept. 5: The town of Dos Cabezas, or "Two heads," is delightfully situated at the foot of the mountain of the same name. The mines, as they are called in the district, are really nothing but prospects, but they are flattering ones. The hopes of the district are centered on the great ledge fronting the town and lying on the south side of the Dos Cabezas mountain. The ledge is about 50 ft wide, and crops out fully 100 ft from the mountain. The ledge is 1,500 ft long, and they all show rich mineral.

COLORADO.

GULPIN COUNTY.—*Register-Call*, Sept. 17: Connection has been made by drift with the east shaft on the Egyptian ledge, Quartz hill, and the work of sinking the main shaft has been resumed. The mine now has plenty of ventilation. Levels are to be commenced below the 100-ft station. In the bottom of the main shaft, a small but rich vein of peacock ore has been struck.

HAYES & WARD.—The owners of this ledge, at Missouri City, are sinking the main shaft, and have attained a depth of 64 ft. The mill ore is yielding from 4 to 5 ounces gold per cord.

KENT COUNTY LEAD.—Another rich strike of a wide vein of mill dirt and smelting iron is reported in the 700 level of this ledge, in Nevada district. This level is in a distance of 500 ft from the main shaft, the present heading of which shows from 4 to 6 ft of pay ore. The same may be said of the back stops which are being worked.

IDAHO.

WALKER DISTRICT.—*Idaho World*, Sept. 17: Joe Donasters and Joe Pitzer have gone up to Walker district, near Banner, to work on the ledge recently discovered by them. It carries both gold and silver, and is 12 ft wide. The vein will be tapped by a tunnel. Quite a number of new discoveries have been made this summer in the vicinity of Banner, and the surface prospects in all of them are very encouraging.

BANNER DISTRICT.—Times are lively here now. The Elmira Co. has about 100 men employed. Their shaft has reached a depth of 160 ft. When a depth of 200 ft is attained a cross-cut that will tap the vein 120 ft lower than ever, will be run to the ledge. Work is still progressing in the old Crown Point tunnel. The mill is running at full blast. Have had considerable trouble with the rock breaker, but everything is lovely now. Under the management of Col. John Brown, President, and Major McDowell, Superintendent, the Elmira Co. has made a success. They are the right men in the right place. The laminit is looking as well as ever, and the boys are taking out rock. The town of Banner will soon be as large as Idaho City. It is building both ways—up and down the gulch.

GRANITE CREEK.—*Idaho World*, Sept. 10: The Chinese company that bought the mining ground of the Danekin Bros., on Granite creek, about 2 years ago, have 70 men employed. Ground sluicing was carried on this season until a short time ago, when water slackened, since which time they have been sluicing up. Five long strings of sluices are used, with 4 men at each string. The rest of the men are employed in the blacksmith shop and at other work. The claims will be run until water freezes. The ground pays well.

NOTE.—Between 300 and 400 men are at work on Bay-horse and Kinnikinnick. The 2 furnaces to be put up in these districts this fall will smelt 45 or 50 tons of ore per day. The men at work for use companies get their greenbacks every Saturday night.

MONTANA.

FOR DEEPER DEVELOPMENT.—*Butte Miner*, Sept. 16: While in the East Mr. John Caplice, manager of the Northwestern mining company, at Philipsburg, purchased for the Trout mine a Knowles vertical sinking pump, with which it is his intention to sink on the Trout to a depth of 200 ft below what is at present the lowest level. Mr. Caplice succeeded in having his lease of the mine extended, and the new Algonquin mine is making a most gratifying success in its reduction of Trout ore.

THE HOLTZ MINE.—F. B. Dunn brought in, yesterday, from the Hallbeck mill, Elkhorn district, Jefferson county, 5 bars, weighing 210 lbs offhullion, valued at \$3,255. This was the result of 1 run in the Hallbeck mill of ore taken from the Holtz ledge, owned by Hallbeck & Black. The Holtz mine is a big one. It is opened by a main shaft to a depth of 225 ft. The ore vein is wide, averaging over 30 ft. Of this 30-ft vein fully 4 ft assays 100 ounces per ton. The last run of the mill cleaned up 73%.

ALICE.—Under the superintendence of W. E. Hall, the property is being developed with the usual systematic energy. The crosscut north from the 700-ft station is delayed for a few days, pending the arrival of 2 mammoth pumps new in transit.

NOTE.—On the dump of the west shaft is 500 tons of ore, and extraction has been suspended until the mill catches up, when a further supply will be taken from the almost unlimited amount opened up between the 1st and 2d levels. The new double-compartment shaft has attained a depth of 120 ft.

SUNNYSIDE.—After lying idle for several months, operations have been resumed under bond. In the east drift of the mine, the vein was supposed to be 10 ft wide, and a little prospecting developed a 6-ft vein of fair-grade milling ore, compact and clean, and giving evidence of improvement.

DIAMOND.—The shaft is 80 ft deep. The ore continues to be of somewhat low grade, but is extracted in sufficient quantities to pay well for reduction.

NEW MEXICO.

MINING SALE.—*New Mexico Press*, Sept. 16: Mr. I. W. England and Mr. Frank Hoxie, of New York, last week completed the purchase of the Rachel Creek and Virginia mines, in El Cerezo district. They bought the interest of the Messrs. Irwin, the discoverers, and also the title of the Maxwell Land Grant Company, and competent judges say that they have secured a most valuable property at a very moderate price. Col. Bergmann has been placed in charge of the development of the mine, and Messrs. England & Hoxie are to put in machinery at once.

MR. CHAS. S. WELLS was in from Cimarronito district on Monday. Mr. Wells showed us assays made from the Contention mine, on Red Jacket hill, by Mr. G. Nixon, of Chicago, that ran as follows, almost entirely gold: \$139.50, \$322.45, \$28.94 and \$109.80.

TEAR. is a great deal of mining excitement in Taos county, and there will be a large amount of litigation arising about titles.

LAKE VALLEY.—*Grant County Herald*, Sept. 18: Much excitement prevails in the Lake Valley district. E. B. Learned, who arrived there last Thursday, informs us that Cox & McLean had just handed their Emporia mine for \$30,000 and their Strichy mine for \$10,000. Dan Green and Jim Swartz had been offered \$1,500 for one of their mines, but refused to take less than \$5,000. Jno. A. Miller's claims are considered among the best in the camp. Mr. Learned himself, while at Hilleborough, and before hearing of the boom, had sold a claim for \$350, and immediately afterwards ascertained that the party purchasing had been offered \$4,000 to secure the property. About 30 miners are at work, and more are constantly arriving.

UTAH.

DRY CANYON MINES.—*Salt Lake Tribune*, Sept. 14: The mining boom has not fairly settled on Dry canyon yet. A few of the old mines are being worked, but not to any extent. Mayberry & Gibbons are doing well on their lease in the upper workings of the Hidden Treasure, while Jim Gould keeps a sharp force prospecting in the depths. Bears & Neader are running 2 jiggers on the Kearsarge dump and are reported doing well—at least well enough to hold on to what they've got. Dick Gundry has 5 or 6 men on the old Queen of the Hills, which force will be added to from time to time. Outside of the few small prospects, on which assessment work is being done, Dry canyon is said to be very dull; but bright days are yet in store for this rich camp.

SILVER REEF.—*Silver Reef Miner*, Sept. 12: Louis Hassel and Henry Freudensthal, two of the chloridors at present working on the Thompson & McNally, dropped a specimen of ore into the Miller office last week that did our eyes good to gaze upon. At the first glance one might suppose it to be a chip off an ordinary piece of ore, but a closer examination would show a crust of horn silver fully an eighth of an inch thick, which covers the surface of the whole specimen.

UTAH CANYON.—*American Fork cor.* Salt Lake *Tribune*, Sept. 0: This camp has been neglected for several years, but is now receiving attention from capitalists. The mountains are rugged, and the veins are generally found in the crevices. The Silver Bell, for instance, a mine that has about 20 ft of \$85 ore, and it is visited by fewer parties in camp than almost any ordinary location, and only because it is at the highest stretch of mountain that lies in the camp. The Pittsburgh mine also is at an extremely high altitude, and so with the generality of good mining properties in the camp known in Utah for years.

PERREBURG.—This is a mine of rather low grade. As if to make up for the quality, nature has very kindly allowed the owners with but little work to place thousands of tons in sight. It is now shipping 15 tons per day to the Morgau smelter.

SILVER BELL.—This mine, without doubt, is the chief work of the camp. It ships several tons almost daily, and will keep up a continuous shipment but for the fact that it is under hand away up in the neighborhood

The Moon's Force.

After getting somewhat accustomed to the greatness and strength of a bar of solid steel 16½ ft. square, imagine one which is one mile square, 5,280 ft. wide and as many thick. If it lay on the ground near the Catekill mountain, its upper surface would overtop their highest summit by more than 1,000 ft. It would be equal to 102,400 such monster bars as the last. Its lifting power would be nearly 240,869,000,000 tons. The mind is utterly unable to grasp such figures. The whole globe contains 1,200,000,000 inhabitants. If each man, woman and child could pull with a force of 100 lbs.—a large estimate—to move such a weight would require the united efforts of the inhabitants of 2,000 such worlds as this.

As I shall have frequent occasion to speak of the load which such a bar could sustain, I shall, for convenience, call it in round numbers 240,000,000,000 tons, neglecting the other figures, because the number is so inconceivably great that taking from it a billion or so of tons will alter the result less than one-half of 1%. This bar is to be the unit of measure, which I shall for the present employ, and with its help I shall attempt to give some idea of the influence of the sun in holding the system together, and of the attraction exerted by the planets upon our earth, and by the earth upon the moon; and, lastly, by the fixed stars upon the sun and upon each other.

We begin with the moon because it is nearest to us, and, with the exception of the sun, is to us the most important of all the heavenly bodies.

If a half dozen persons were asked how large the moon appears, they would give as many different replies: "The size of a cart wheel," "Twelve inches across," "The size of a dining plate," "As big as a man's head," etc. Probably no one would mention a smaller measure, yet a cherry held at arm's length much more than covers its disk. It is difficult to believe that so small a body exerts any considerable influence on the earth which seems so immensely larger. It is easy to admit that the earth holds the moon in its orbit; but that to do this, to bend its course into a nearly circular orbit, requires any great outlay of force, is not so clear. Our credulity would be taxed were we asked to believe that the moon in its efforts to move in a straight line would break away, although held by a bar of steel one ft. square, for that means a force able to lift nearly 9,000 tons. An astronomer would grant it, making first a mental calculation to see if he was justified in doing so; but even he would hesitate, and perhaps would deny that it was possible the moon could pull asunder one of those great unit bars one mile square, and equal to more than 27,000,000 bars each one ft. square.

But he would have no hesitation in saying "Impossible!" if told that, rather than change its course from a straight line to its present curve, our willful little satellite would snap like pack-thread not one, nor two, nor three of those unit bars, but the united strength of 10,000—or, in other words, one gigantic bar whose section is 100 miles square. Yet more than eight such bars, or more precisely, 87,500 unit bars, would but barely deflect the moon into its present path*.

* The non-astronomical reader may, perhaps, need to be reminded that the moon does not move easily and naturally in a circle—or ellipse—but that its path, if left to itself, would be a straight line—a tangent to its orbit. Consequently, the moon requires to be forced into a curve.

—Popular Science Monthly.

THE LAW OF ENTAIL.—Much apprehension exists in this country as to the present powers of entail in England. There is no such thing as a law of primogeniture, except in so far that if a man die intestate his real estate would pass to his eldest son, except in Kent, where it would be divided among all his sons. Up to the close of the last century, the power of entail was illimitable. It was curtailed in consequence of the extraordinary will made by a merchant named Thellueson, of Swiss origin, who accumulated a vast fortune in London, partly by buying up jewels from French emigrants at the time of the great revolution. Mr. Thellueson intended his money to accumulate until it would have reached about \$700,000,000. The government deeming it undesirable that any subject should possess wealth so colossal, introduced a bill limiting entail to living persons and 21 years afterward. This is not much greater than the power of entail in New York, and almost identical with that in Massachusetts. Many estates in and around New York—the Lefferts, Rhinelanders, for example, are entailed. In England hundreds of great properties are completely unentailed, and it is purely the custom, not the law, of the country which will cause them to be transmitted to the eldest son. Men who are very liberal in politics favor the custom, because they think it keeps up the position of a family, and that were an estate divided up in the next generation none would be better for such division. It is not generally understood here that the law in England permits a man to leave his property precisely as he pleases, and that a duke can leave all to his footman. The great estates, for instance, of the duke of Hamilton, premier duke of Scotland, were, up to the time of his marriage, absolutely unentailed. This came out in some law proceedings. —Springfield Republican.

Indian Grass or Wood Grass.

Our engraving shows a grass which will be recognized by many of our readers who hail from the prairie States, where it figures quite largely in the native pasture. Botanically, it is a sorghum (*Sorghum nutans*), and it is tall-growing in its habit, the stalks being from three to four ft. high, in favorable locations.

In order to show how grasses may vary in chemical composition and thus differ widely in economic value, we place side by side the proximate analysis of *Sorghum nutans* and *Sorghum Halapense* (green valley grass):

	<i>Sorghum Nutans.</i>	<i>Sorghum Halapense.</i>
Oil.....	1.57	2.25
Wax.....	.10	.61
Sugars.....	7.27	7.37
Gum, etc.....	3.75	5.14
Cellulose.....	36.70	25.15
Amylaceous do.....	27.25	25.87
Alkali extract.....	14.44	15.58
Albuminoids.....	3.29	13.18
Ash.....	5.63	4.65

The analyses were made by Dr. Peter Collier,



INDIAN GRASS OR WOOD GRASS—*Sorghum Nutans*.

chemist of the United States Department of Agriculture. The superior richness of the *S. Halapense* in oil, sugars and its notable increase of albuminoids, are plain evidence of its great comparative value. It has more gum also, which there is some reason to believe is convertible into sugar in the animal digestion. On the other hand the *Sorghum Halapense* has much less cellulose, which is indigestible and worthless. We gave an engraving of *Sorghum Halapense* in our issue of March 27, 1880, and it is interesting to compare their appearance in connection with this statement of their comparative composition.

Sorghum nutans has not been generally considered of much value except as one of the grasses in the native pasture, although if cut early the hay is nutritious. The main trouble with it is that it grows rather scantily and does not cover the ground well.

The stalks are smooth, hollow and straight, and have at the top a narrow panicle of handsome straw-colored or brownish flowers, which are rather drooping when the seed is formed.

There is one mining district in this country called "Tin Cup," and another one has been named "Old Hat."

A GIGANTIC MINING PROPERTY.—The property of the San Pedro and Canyon del Agua M. Co., located in New Mexico, of which it was reported that Gen. Grant had been elected president, is very fully described in the *New Mexican*, published at Santa Fe. According to that journal, the property embraces 36,000 acres, covered with pinon timber, for the greater part, and including the San Pedro, Tuerto, San Yedro and Sandia mountains, all known to contain mineral. It is 20 miles from the railroad station at Bernalillo to the village of San Pedro, which has grown up centrally, in relation to the copper and gold veins, and the placers. The copper and gold mines are about a mile from the village, at an elevation of about 8,000 feet, and on the west side of Tuerto mountain. The veins are about 30 feet wide, encased in well-defined walls, cropping out laterally for a distance of half a mile, and pitching into the mountain with a dip of 15 degrees. Ore of one strata is composed of carbonates, silicates, and

THE ENGINEER.

A Projected Underground Railway.

The pressure of travel and traffic has become so great in New York city, that the surface scarcely offers sufficient accommodations for its present and growing needs. To meet this want in the least objectionable way it is proposed to construct an underground railway. The *Iron Age* contains a detailed account of the scheme, of which we present a summary. The certificate of incorporation of "The New York Underground Railroad Co.," has been filed in the county clerk's office; the plans for the road are completed; and it is promised that the contracts will be awarded shortly, and that the actual work of excavation will begin this fall. The board of directors is composed of well-known citizens. It is stated that Gen. G. B. McClellan, who is one of the directors, will be the president of the company. It is also said that arrangements have been made in Europe for placing the bonds of the company on favorable terms. It is the expectation of the company that the road will be completed by January 1, 1883, and will be in operation when the World's fair is opened.

The plans for the construction of the road have been executed by Walter J. Morris, C. E. According to these plans, the road will extend from South ferry along the eastern side of the Battery to Broadway and Bowling Green, thence up Broadway under Union square, to Madison square. The main line will continue from this point under Madison square and through Madison avenue to the Central park, beyond which the plans of the company do not at present look. Stations will be placed at convenient distances along the route. The road will be built in this way: Two single-track tunnels, each 15 ft. high and 12 ft. 6 inches wide, will run side by side, and separated by a brick wall. They will lie directly under the middle of Broadway, just below the water pipes, and reaching nearly to the curb on each side. The tunnel will be partly arched and partly supported by beams. The street will first be covered with heavy planks and timbers—in fact converted into a plank road—over which the usual traffic may continue uninterruptedly during the work of excavation. The tunneling will be done from a side street. A working shaft will be sunk just off the main avenue, through which the work will be pushed for a few blocks at a time, until another similar working shaft may be necessary further along. The planking on the surface will be laid for 1,500 ft. at a time, and removed as the tunnel is completed, while underground beams and supports will be placed every 8 ft. ahead until the walls of the tunnels are bricked up. The planking will be laid by night, and thus it is hoped that it may never be found necessary to close the thoroughfares under which the road passes. The tunnels will, as a rule, follow closely the surface grade of the streets, and the tracks will be at an average of 25 ft. underground. On Murray Hill, at Thirty-eighth street, however, the pavement will be 62 ft. above the tracks in the tunnels.

One of the chief advantages claimed for the tunnel will be its dryness. The walls will be built of bricks and cement, with a hard white finish, and covered on all sides with asphalt. It is expected that this will render the tunnel impervious to water and the system of ventilation is relied upon to prevent any dampness. As this will give a uniform temperature in the tunnel, no allowance will be made for the expansion and contraction of the rails, which is necessary in open-air railroads; and the rails will be laid on a hard bed of ballast, covered to prevent dust; with the ends nearly touching in one continuous rail. This method will, it is believed, prevent the usual disagreeable "joggle," and will enable the cars to roll smoothly. Great locomotives of 60 tons, similar to those employed in the London underground railway, will be used; and they will burn coke and consume their own smoke. The exhaust steam will be condensed, and nothing will escape to impair the atmosphere in the tunnel but a little gas. A part of the care will be after the style of the Pullman parlor cars, and there will be a modification of the English railway carriage, with the entrance at the side. It is proposed to light both cars and tunnel by electricity; an electric machine will be placed on each engine to run the headlight and the candles in the cars.

The problem of thorough ventilation has been considered carefully, and the engineers believe it has been solved. At the principal stations air-shafts will rise up 75 ft., and other openings will be made at frequent intervals. Through these air will be introduced by artificial means. A novel feature of the system is making the locomotive a sort of piston head or plunger by means of a broad flange about the cab, reaching nearly to the sides of the tunnel. Each train will, it is expected, force the air ahead as it runs and cause a suction and consequent draft of air in its wake. By having two tunnels, the trains in each running always in one direction, a current of air is thus established. The vitiated air will be carried ahead to the first opening and expelled, while fresh air is drawn in by the passage of the train. In London, where two trains pass in opposite directions in the same tunnel, a whirlwind is caused and the gases and smoke, if any, eddy round, and remain in the tunnel. By the system of two tunnels it is thought that

MINERS and prospectors are quietly leaving Leadville to prospect at Battle Mountain.

this defect can be remedied with but an inconsiderable addition in the power expended.

The underground stations will, as a rule, be under street corners. At the principal points, such as the Battery, City Hall, Union square, etc., splendid ornamental stations will be built on the surface. The plan of the engineer requires first safety and comfort and then ornamentation. The stations underground will be provided with comfortable sitting rooms, and will be thoroughly lighted by electricity. The platforms will be 400 ft. long and 14 ft. wide. Trains of from 8 to 10 cars can be run at a speed, it is estimated, of 25 miles an hour, including stops, and each train will seat from 800 to 1,000 passengers. Trains can be run every three minutes. The fare is to be uniformly five cents. No estimate of the cost of this stupendous project is published, but it will probably be millions for every mile.

Outbursts of Heat in the Sun.

Lately many scientific journals have contained accounts of the observation of new and unexpected variable stars. The more carefully we study the stars the more evident it becomes to us, that a large proportion of them undergo and exhibit changes of light with a certain degree of regularity. Very few stars change their brilliancy so quickly as Algol, the "winking demon," in Medusa's head, but there are many that wax and wane in a remarkable manner.

This subject becomes especially interesting, remarks a writer in the *New York Sun*, when we consider the fact that reasons have been shown why our own sun may be regarded as a variable star. Prof. Proctor in his essay on the "End of Many Worlds," suggests that periodical outbursts of heat in the sun may account for the curious traditions running alike through the Indian, Egyptian, Chinese and Greek mythologies, that the earth at certain epochs undergoes destruction and renovation by fire. On such a supposition the story of Phaeton becomes the tradition of an actual event in the earth's history. According to the myth, Phaeton persuaded his father Apollo to let him drive the car of the sun for a day, lost the road, and, approaching too near the earth, set Olympus on fire, consumed cities and whole nations with flame, and turned the northern end of Africa into a waterless desert.

The cause of any sudden access of heat in the sun, or in a star, is believed to be the downfall upon its surface of a vast quantity of meteoric matter whirling in the track of some comet. We have records of a sudden brightening of the sun in modern times. A remarkable phenomenon of this kind occurred on September 1, 1859, and although it was of very brief duration, it produced startling effects in various parts of the world.

If there is a mass of meteors rushing in an orbit that the sun crosses at certain epochs, and which then causes his fires to burst out with the effects described in the ancient traditions, they have thus far escaped the ken of the astronomers. Observation has shown, however, that if such meteors exist they are to be looked for in the wake of a comet, and we can depend upon the astronomers to give due notice of the comet's appearance.

RAPID FOREST DESTRUCTION.—An intelligent correspondent of the *Cincinnati Gazette*, after an investigation in the pine regions of Michigan, reports the judgment that the mills in the Alpena district have only 15 years' supply left, and adds: These figures agree very closely with those given me a few weeks ago by the president of the largest logging company on the Mississippi river, operating in the Wisconsin pineries, a region that has been worked much less extensively than the Michigan pineries. They would last, he said, 30 or 40 years. The Minnesota pineries are not so large as either of the others, and will probably not survive them. In from 25 to 40 years the last tree will be cut, and the entire country from Maine to the Rocky mountains must learn to live with meager quantities of pine lumber brought at great expense from distant countries. The pineries cannot be replaced. A full grown tree represents hundreds and hundreds of years of growth. I saw small pines, no larger round than a man's arm, bearing the scars made by the axes of the United States engineers 35 years ago. What ages, then, must be required to produce a tree three or four ft. in diameter? When these forests reach the condition of the pineries of Maine and New York, and become extinct, no new ones will take their places. The American of the near future must learn to hew and build without pine, and marvel at the thoughtless recklessness of his ancestors.

OBELISKS AS LIGHTNING CONDUCTORS.—Mr. F. Le Page Roup, a student of the Coptic language, writes as follows to the *Academy*: "A good deal was written some time ago on the subject of obelisks. I am not aware that attention has ever yet been called to an important piece of evidence as to the use of this kind of monument. This evidence is found in an inscription from the temple at Edfu, published by Brugsch Bey in the *Zeitschrift für Ägyptische Sprache*, September, 1875. In the 34th line of this text 'two large obelisks' are expressly said to have been constructed, *her tekles shena enen en Nu*, 'for the purpose of cleaving asunder the storm-cloud of heaven.' Brugsch had already, in the *Zeitschrift* of 1871, p. 143, quoted a similar text in reference to the great flagstaffs of the pylones."

USEFUL INFORMATION.

HOW RAILWAY TIME IS KEPT.—There are in use between this city and New York 13 electric clocks, two of the number being placed in the waiting-rooms and one in the dispatcher's office at the Grand Central depot, New York. The time on the clock in the depot at East Albany corresponds exactly with the time in New York. Each one of the clocks is connected with the General Superintendent's office in New York, in which the railroad time is kept on what is called the "big clock." Conductors, train men and others are compelled to keep their watches in strict conformity with the Superintendent's clock. It is set by standard time, and connected with the time service department of the gold and stock telegraph. The time is distributed over the line each week day as follows: At 10 o'clock 58 minutes and 3 seconds A. M. the word "time" is sent by the main office to the telegraph stations between New York and Albany. This word is repeated for 28 seconds, during which time operators must see that their instruments are adjusted. At 10 o'clock and 50 seconds, seconds commences beating, and continue for 50 seconds. The word "switch" is then sent over the wire, and operators having electric clocks connect them immediately with the circuit known as number 9 wire. Ten seconds are allowed in which to make the connection. At 11 A. M., with one touch of the New York key, the hands on the different clocks are set to 11 o'clock. If they are fast or slow, they change all at once to the hour named.—*Albany Argus*.

SALICYLIC ACID AS A PRESERVATIVE.—A correspondent of the *Journal of Microscopy* says salicylic acid has been strongly recommended in this journal as a preservative, and I have had very good success with it in mounting vegetable preparations of all kinds. One difficulty, however, is that it dissolves very sparingly in water, and alcohol produces changes which are frequently undesirable. It is well known that salicylic acid dissolves freely in a solution of borax, and it is also familiar to most persons that borax itself is quite efficient as a preservative. It, therefore, occurred to me to combine these two, and I have found that two parts of salicylic acid and one part of borax dissolved completely in half an ounce of glycerine, and that this solution when mixed with three parts of water, forms a most excellent preservative fluid for coarse organisms. More delicate preparations should be mounted in the above solution diluted with five parts of water. Preparations mounted with this solution are very durable.

HORSE LEATHER.—By a recent Cabinet order, horse leather has been adopted as the material of which the boots issued to sailors of the German navy are in future to be made. Experiments with horse-leather boots have, it appears, been carried on for the past 18 months, and with such satisfactory results that the use of calf skin is to be altogether abandoned in making naval boots and shoes. The leather used is to be made of the skin of the quarters of the horse, the flesh being carefully scraped off, so as to render the leather soft and pliable, while still remaining, to a large extent, waterproof.

PAPER DISH MATS, which can be washed without the slightest injury, and which very nearly resemble the wicker dish mats commonly used on the dining-table, are among the most recent novelties. The mats are stamped out of cardboard, in both round and oval form and in any desired size. The wicker-work pattern is lithographed, after which the work is finished up by the application of a very hard kind of varnish. The paper mats, it is claimed, will last as long as wicker ones, are much cheaper, and possess the additional advantage of a smooth surface.

SOLDERING LIQUIDS.—The *American Manufacturer* of July 23, 1880, gives the following recipe for soldering liquid: "Dissolve scrap zinc in excess in hydrochloric acid by means of heat, neutralize the free acid with water of ammonia, and dilute with an equal bulk of water." In practice the following has been found as good as the above and easier to prepare: Dissolve chloride of zinc in about twice its bulk of water for iron and steel articles. For copper, brass, etc., it may be diluted to four or five times its volume. The chloride may be had of any wholesale druggist for about ten cents per ounce.

PRESERVING LEATHER.—To preserve leather hose, helting, etc., in good condition, use crude castor-oil, warmed, if possible, and freely applied. It increases the pliability of the leather and the cling of the belts, and does not become rancid. Rats avoid it. In hose it should be pumped in from the interior under considerable pressure, thus thoroughly filling the pores.

MAKE YOUR OWN BAROMETER.—A sheet of paper, dipped in chloride of cobalt, when the weather is to be dry and pleasant will become blue, when wet weather approaches it will become pink. The barometer flowers of France are thus manufactured.

AN ABSURDITY.—To purchase wood by measure. Its heat-producing qualities are in proportion to its weight, if seasoned. When in Paris, our wood was furnished by the pound.

GLUCOSE.—The manufacture of glucose in this country has grown to enormous proportions, there being at present no less than \$30,000,000 invested in it. The material here is made entirely from corn, and so successful has it been, that quite a *fièvre* exists in connection with it throughout the West, where a number of new factories are being set up. This industry originated in the year 1863, with Messrs. Gessling & Bradley, who at that time improvised an experimental factory in Buffalo, to determine if grape sugar and syrup could not be made from corn. The product had been made for years in Europe from potatoes, and imported into this country at prices ranging from 8 to 12 cents per pound; but up to that time sugar from corn was not known as a commercial article. The experiment was successful, and from this beginning has gradually developed what is now an immense industry. At the present time, instead of importing from Europe an inferior article of grape sugar made from potatoes, at a cost of from 8 to 12 cents, as above noted, large quantities of corn sugar are exported at about three cents. A bushel of corn produces 30 pounds of glucose.

TO TEST MILK FOR WATER.—A German chemist furnishes a very simple procedure for testing the amount of water in milk, which can be applied by any one. All that is required is a small quantity of plaster of Paris, say one ounce. This is mixed with the milk to a stiff paste, and then allowed to stand. With milk of 1.030 specific gravity, and a temperature of 60° F., it will harden in 10 hours; if 25% of water is present, in two hours; if 50% in one and one-half hours, and with 75% in 30 minutes. Skimmed milk which has been standing for 24 hours, and is of 1.033 specific gravity, sets in four hours; with 50% of water, in one hour, and with 75% in 30 minutes. Heat should not be applied, as then the use of the thermometer would be required. This test is certainly very simple, and not costly.

A SUBSTITUTE FOR EMERY.—Garnet is now being extensively used as a substitute for emery. It has been introduced both for wheels and for paper—the latter being known as "ruby paper."

GOOD HEALTH.

How We Starve by Overeating.

EDITORS PRESS:—Dr. Tanner's fast has given us new light on the important question, how long a robust man may starve himself without permanent injury, and, perhaps, with positive benefit. But the very common case of starving oneself by overeating is to most people (though few know or think it) of much greater personal interest. It is because the statement that we can, and too often do, starve ourselves by overeating seems so paradoxical, that I hope every reader of the PRESS will do himself and friends the justice of seeing if it is true. How often do kind friends persuade the tired mother to eat a little more; or the worried man of business to take an extra lunch or supper, when already the body is at its utmost strain and can no more digest an extra meal than it can undertake extra labor. No man in these busy days can afford to neglect the stern fact that digestion is labor, and in weak persons often just about all the labor they are capable of. This fact is daily recognized in hospitals, especially by the surgeon, who, dealing most with the accident cases, has comparatively healthy stomachs to deal with. Yet here, when all the strength has to be husbanded to meet the strain of a surgical operation, a surgeon dislikes to operate before he has put his patient through a course of simple diet, with rest. Generally too he gives him such medicines as will excite the bowels, kidneys, etc., to carry off those waste matters from his system which too often are simply due to gross feeding.

It would take too long, and probably also convey less of the real truth, were I to go into detail and show the nature and magnitude of the digestive processes. A glimpse of it may be gathered from the fact that our best authorities agree that the internal muscular labor of the body consumes about four-fifths of our daily strength and food; that is, that the churning, straining and pumping of the food and digestive fluids uses up most of our food to make the remaining fifth available for use in our daily labor. This is a big thing I hear some one exclaim. Yes, and the following may, perhaps, seem bigger: Thirty lbs., or nearly twice the weight of the whole blood in our bodies, is poured out daily from the blood vessels (and of course absorbed again when its work is done) into the alimentary canal for digesting purposes. Our two best authorities—Playfair and Letheby—differ but very slightly in their estimates. The average of both states that daily the blood secretes $\frac{3}{4}$ lbs. of saliva, $\frac{1}{4}$ lb. of gastric juice, $\frac{8}{9}$ of pancreatic fluid, $\frac{3}{4}$ of bile and $\frac{1}{2}$ lb. (I believe much more) of intestinal fluid. By measure this comes to 21½ English pints, or more than three American gallons; and all this has to pass through miles of little tubes too small for the naked eye to see. Evidently the 17 lbs. of blood with which physiology credits the average man has to be active all the day long. The blood much resembles a restaurant waiter, who is constantly passing from the kitchen (the stomach, etc.) to the dining hall (visceral veins—lymphatics) with viand of all kinds, and as

constantly returning again with the dishes, the spoons and whatever the guests refuse.

These various digestive fluids are beside of different chemical composition. Each one, too, contains a special organized ferment, powerful to the digestion of some special part of our food. Now these ferments are in a sense like the seed of a plant, and their production must exhaust the organ producing them much as the seeding of a flower exhausts the plant producing it. No wonder then that indigestion is the rule and not the exception in this bustling busy age.

If a man must, then, overwork, let him beware of overeating. Many ignorantly overeat, deluded by the temporary pause that each meal gives to that feeling of continuous exhaustion, which is quite as often caused by excess of food as by excess of work. This temporary strength is probably due to the stimulation of that great epigastric nervous flexus [which is close to the stomach. It has charge of the digestive process, and by food it is excited, and receives an extra supply of blood, just as the eye is excited to action by light, or the ear by sound. This great flexus is the focus of sensation for the abdomen, and its exhaustion we call hunger; but I guess Americans oftener exhaust it by too big than by too little meals, and either cause, it is evident, may give a feeling of hunger. Most of us could easily pick out from among our acquaintances many more examples of weak people who eat much than of weak ones who eat little. The big eaters probably are weak because they habitually eat up to their fullest vital capacity, and are, in fact, like so many hogs—living to eat, instead of eating to live.

But overeating does not merely use up all the working strength in digestion. Unless limited very strictly to the point of complete digestion, much of the food may pass through only the first stages of digestion. It may be acidified in the stomach, but fail to get neutralized in the bowel, where fermentation of an unnatural kind will cause flatulence, and give rise to impure fluids. These absorbed into the blood give feebleness of constitution and liability to disease, and at the same time overload and overwork the liver, kidneys, lungs, skin, and all purifying organs. This habit is the commonest cause of many of our complaints.

To the man or woman who overeats and will not work I have nothing to say. He or she is a hog. But to the wearied mother who wants strength to get through her work I would say: Aim first at eating those foods which need least digestion—roast or broiled mutton, toasted bread (buttered when cold), boiled rice and milk, oatmeal mush, milk diet of all kinds. And here let me remark that milk will, as a rule, agree with any one, if well boiled, and then diluted one-half with weak tea or coffee, or any other fluid, to taste. Many people find that milk does not agree with them, but, boiled and diluted, it seems quite to lose its bilious nature. Eggs, too, are good; also simple soups, and ripe fruit, raw, or cooked with a little sugar. Apples, well washed and baked in the oven, no stomach will feel—it is the sugar of cooked fruit that so often disagrees. Do not attempt too many meals, or have them too near each other. New food introduced into a stomach just finished with and about to pass the last meal into the bowel, may disturb the process, and spoil both the new and the old. Yet something may be taken between meals, if it be nearly all fluid—say a little beef tea, made with cold water slowly heated up just to a boiling point, or a little gruel, made with rice, oatmeal, graham flour, etc. Stir up a tablespoonful of one of these with as much cold water as will thin them to the consistency of cream. Then pour on a pint of boiling water, stir well, and salt it to taste. This has the advantage of being quickly made. A baked apple, a pear, an egg beaten up with a little sugar and water, or any of these simple things, will not only give strength, with almost no labor in digestion, but, taken an hour before food, often give an appetite, and ensure the better digestion of the following meal.

SANTARIAN, M. D.

THE DISEASES OF UNDERWORK.—A medical exchange says: We have heard a great deal about the diseases of overwork, and it would be interesting to see if something cannot be said now regarding the "diseases of underwork." That man is naturally a lazy animal is a proposition often made and never refuted. We have a great many lazy people even in this country. It is to be hoped that some enterprising pathologist may make a special study of these. He may find a new disease. There are certainly cases of adiposithenia and gastrosthenia. Who will be the first man to write a book on the subject?

LUNG AND LIVER COMPLAINTS are certainly benefited, often cured, by a free consumption of onions, either cooked or raw. Colds yield to them like magic. If this esculent be taken at night all offence will be wanting by morning, and the good effects will amply compensate for the trifling annoyance. Taken regularly, they greatly promote the health of the lungs and digestive organs. An extract made by boiling down the juice of onions to a syrup, and taken as a medicine, answers the purpose very well, but fried, roasted or boiled onions are better.

A WRITER in the *London Lancet* remarks that at the Middlesex hospital, female patients who have suffered many years from sick headache, evidently of a hereditary character, have been greatly benefited, if not cured, by the administration of ten minim doses of tincture of Indian hemp, three times a day, between the attacks.



W. B. EWER,..... SENIOR EDITOR.

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The Week.

City and country are now in the full enjoyment of sweet autumn days. This is perhaps on this coast the most delightful season of the year. The weather is charmingly variable, clouds and mist and a chilly atmosphere are followed by brilliant sunshine and a larger measure of ozone, which imparts new vigor and buoyancy to the spirits, and impels man and beast to move with increased "snap." Vintage is now in the full flush of realization, and the poetry of the vineyard and its gold and purple clusters are giving way to the practical phase of raisins and wine. In the mining regions many of the companies have finished their season's work, which has been generally prosperous, and are busy in their preparations for the coming season of rain and snow. In other counties again, where the conditions are more favorable, mining progresses without interruption. The year has advanced sufficiently to indicate that it has been unusually prosperous to the miners of this State.

In this city during the week a noteworthy incident has occurred, which is full of interest to our residents. Mr. R. H. McDonald, a well known and wealthy citizen, has submitted a proposition for the establishment of a "Christian University" in this city. He proposes to give the munificent sum of \$100,000 on the

condition that the university shall be established in conformity to certain articles which he has drawn. This is the first instance in the history of the State where any of her wealthy citizens has made available during his lifetime so large a gift for the purposes of education.

The Author's Carnival, which opened brilliantly on Monday evening at the Mechanics' Institute pavilion, is in the full tide of success. The first night was graced by the presence of the Presidential party, and the splendid scene has never been excelled in San Francisco. As the affair is designed to aid our home charities, it is pleasant to mention that its success may be regarded as fully assured.

The State fair at Sacramento city is in full progress, and the display in every department is represented as complete. So great has been the demand of exhibitors that there is complaint of a want of space in the pavilion. The attendance is large, and was increased doubtless by the visit of the President.

A Quick Collapse.

About four weeks ago the stock of the San Pedro and Canyon Del Agua mining company of New Mexico took a sudden jump in the New York market from about \$1.25 per share to \$7. The reason assigned was the announcement that Gen. Grant had accepted the Presidency of the company. Since then many people who lost heavily by the rapid decline of the stock have complained that the Grant story was empty and solely a "hoom" to raise the price, and that after the operators had secured their pile they allowed the thing to collapse by announcing that the ex-President had changed his mind and declined the proffered honor.

This is the news that comes to us over the wires from New York, and serves as an illustration of the absurd ideas many people have of mining operations. If they invested in that stock simply because Gen. Grant was to be President, they invested more on the individual than the mine, and more on a stock-gambling deal than a legitimate piece of business. How Gen. Grant or any other illustrious man could benefit it more as a mine is more than we can see. His name would serve to float the stock, it is true; and it was on this basis that people bought the stock, hoping it would rise and they could sell to others. Having been taken in themselves in the same sort of way they wanted to take in others, we have no sympathy for them whatever.

Gen. Grant acted with his usual good sense in declining the Presidency of a mining company. He never pretended to have any knowledge of mining matters at all, and was of course only wanted to give tone to some company that needed great assistance in being brought before the public. A legitimate enterprise would be more likely to go on its own merits.

At any rate the people who lost money on the venture are not to be pitied in the least degree, as they were "done" as they hoped and expected to "do" others.

Mining Company Presidents.

It is worthy of note that in all the new mining companies formed in the Eastern States great care is taken in the selection of president, and every effort possible is made to get men of prominence to take the position. In this we see evidences of tendencies toward stock dealing rather than mining, as no such trouble seems to be taken in selecting a superintendent. We have got over this ourselves some years ago, and look upon the president of a mining company in the light of a superfluous individual, rather to be tolerated than brought prominently forward.

In fact, he is, as a general thing, merely a figure-head. He draws a salary, usually a big one, and does not do anything for it. He is supposed to be a sort of financial manager and presides at directors' meetings. As far as contributing anything at all to the resources of a company he is utterly useless.

It is only large companies, with stock for sale, that need a president at all. Some of our big mining magnates have one president who does duty for dozens of companies in which they are interested. He doesn't do anything and is not expected to do anything, and wouldn't know how to do anything if he were asked to. Lots of these presidents never visited their mines and hardly know where they are.

The superintendent is the officer who is the important one as far as the actual mining goes. It is he who plans, arranges and carries out. The president seldom knows anything of mining, practically. In fact, in nine cases out of ten a president is not needed, except to comply with a State law or for some such reason. They may and do help to float companies on the stock markets, but as far as any assistance to actual work is concerned, might as well be left out of the list of officers.

MESSRS. WHITTIER, FULLER & Co. were especially fortunate at the recent Mechanics' fair. They received a gold medal for best display of paints; a silver one for prepared paints for general use; and another gold one for lead and its manufacture. If we recollect aright they are the only exhibitors who received two gold medals.

Ice Water for Miners.

When the cage fell in the Imperial shaft on the Comstock the other day, only one of the 10 men who fell with it was saved, and he was cut and bruised from head to foot. He has a cut on the back of his head that reaches down to the skull, and is nearly four inches in length; also a cut above his right hip that reaches through into the cavity of the abdomen. He was able to converse, though appearing somewhat drowsy in his actions. He said he could remember nothing about the accident; that it seemed to him as if he had been asleep. He could not remember getting aboard the cage to start up.

A suggestive fact in connection with the accident as related by the *Enterprise* is, that when brought up out of the mine and still wandering in his mind he spat out the brandy that was put in his mouth, but when tried with ice water he eagerly grasped for it and drank it. Dr. Harris seeing this eagerness allowed his patient to have all the ice water he would drink, and found that the effect was excellent. Of course accidents frequently occur around the mines, and heretofore it has been the practice to pour brandy into wounded men. The doctor is now of the opinion that in many cases ice water would do them more good. All miners are used to drinking great quantities of ice water in the heated levels. When an accident occurs to any of them down in the hot regions of a mine the chances are that, although unconscious, they are almost burning up with thirst by the time they reach the surface, and all they ordinarily get is brandy or whisky, which must heat instead of cooling them. If given brandy or whisky men under these circumstances should doubtless also be offered water. After this experience this will no doubt be done hereafter.

Underground Iron Structure.

For wide levels, air-ways and principally transport galleries, wrought iron structures are introduced in European mines, in the shape of arches or ellipses made of double T iron. Such iron fastenings were exhibited at the Dusseldorf exhibition by the Saarbrücken mines, the Hibernia colliery, the Phoenix company and the Gutehoffnungshütte iron and steel company of Oberhausen. Another species of underground iron structure are the water-tight trap doors in water-tight dams of masonry, which in the principal levels are walled across at certain places, in order to secure the vital parts of a mine against the sudden inroad of water from the water-bearing strata above the old workings, which may possibly settle down in such a way as to open a way for the water. These dams are provided with one or two strong iron trap doors which allow the ordinary passage, but in case of need can be secured by water-tight packings and strong fastenings. All provident European mines have secured themselves in such a way against a sudden drowning out; for instance, the collieries Westende, Tremonia, Riugeltanhe, Maria Anna, Neu Coln, Holland, Hanover, Engelsburg, Constantin and many others. Such iron trap doors weigh nearly two tons each, and are made of thick boiler plates. In case that part of the mine behind a dam should have run full of water, there are pipes with valves provided which pass through the dam and allow of a gradual tapping off.

Social Science Club.

Realizing that the heterogeneous population of this State, and especially of this city, is called upon to act in many emergencies incident to new countries without the benefit of the knowledge and experience of older communities, and that this generation is founding a society on these isolated shores, which must suffer for our mistakes, a few gentlemen have conceived the idea of establishing in San Francisco a Social Science Club, with the design of eliciting the best work of some 50, more or less, of our best minds in the monthly discussion of those topics of social science most interesting in California, and of influencing public opinion in the direction of economic truth.

A preliminary meeting is to be held in the rooms of the Board of Underwriters, 418 California street, on Monday evening next. The call for the meeting is signed by such gentlemen as George Davidson, Horace Davis, Eugene Casserly, John H. Boalt, C. T. Hopkins, Horatio Stehbins, John N. Pomeroy, Alex. Del Mar and Ralph C. Harrison.

IRA G. TODD, an ingenious machinist at the Florence sewing-machine shops, has invented a new mechanical motion which will be of use for sewing-machine work, silk and other light machinery. The motion is a positive one and is to drive the shafts at right angles with each other, any distance apart, without using bevel gears. The motion consists of a peculiar double eccentric and ordinary pitman connecting on the end of the crank arm of the lower shaft. This motion has long been sought for in mechanics, so that the noise of the bevel gears could be dispensed with.

The Lick Observatory on Mount Hamilton.

At the last meeting of the California Academy of Sciences the report of Prof. S. W. Burnham, of Chicago, to the Lick Trustees, was received. The report is on the observations made at Mount Hamilton with reference to the erection of the Lick observatory. The trustees state that the preliminary work on Mount Hamilton has already been commenced, and will be prosecuted as rapidly as possible under the circumstances. The smaller equatorial telescope, of twelve inches aperture, has been ordered from Alvan Clark & Sons, of Cambridge, Mass., and will be placed in position early in 1881, and the great equatorial telescope, meridian circle, and other instruments, will be contracted for at an early day. It is not expected there will be any further delay in putting the Lick observatory in complete working order, other than that incident to the importance and magnitude of the undertaking.

Prof. S. W. Burnham, who has made observations from Mount Hamilton, speaks of its remarkable fitness for the site of an observatory. There is a wonderful freedom from clouds and fog. The elevation is 4,250 ft. above the sea, and the north peak is 140 ft. higher. The view from these peaks is unobstructed in every direction, there being no higher ground within a radius of 100 miles. The scope of the horizon from Mount Hamilton takes in more ground, according to Prof. Whitney's judgment, than almost any similar peak in the United States, there being no obstructions to the view from any quarter. The Pacific ocean can be seen on the west, Lassen hutte on the north, and the Sierra on the east. Prof. Burnham's preliminary observations at Mount Hamilton were taken by a six-inch refractor, and a temporary dome was erected 12 ft. in diameter, and made to move on 12 iron balls. Out of 60 nights, 42 were simply perfect, first-class nights, and 7 were good, while 11 only were cloudy. Most of the nights were perfectly calm and still. One of the most important conditions is the remarkable dryness of the atmosphere, which is particularly favorable to telescopic observation. Prof. Burnham reaches the conclusion, from his observations made upon Mount Hamilton, that the site chosen for the Lick observatory offers advantages superior to those found at any point where a permanent observatory has yet been established upon earth. The remarkable steadiness of the air, and the continued succession of nights of almost perfect definition, are conditions not met with elsewhere. The low altitude at which observation can be made is a matter of marked importance, particularly in connection with the southern sky, not ordinarily accessible to observations in the northern hemisphere. The ease with which difficult objects can be seen, almost down to the horizon, is very important. He observed close pairs of double stars down to forty-three degrees, or more, of south declination. The permanent steadiness of the air during the whole night will greatly increase the amount of telescopic work over what could ordinarily be done on good nights in most places.

Prof. Burnham prints a catalogue of 42 new double stars discovered at Mount Hamilton, thus practically demonstrating that work has already begun in earnest; and he requests that the various publications of observatories and of astronomical and scientific societies may be sent in exchange for the permanent library of the now located Lick observatory, on Mount Hamilton, California.

TROUBLE WITH OHIO COAL MINERS.—There has been serious difficulty at the Corning coal mine, Ohio, between white and colored miners. On the 15th inst. Gov. Foster and Adjutant-General Gibson received telegrams from Corning, Perry Co., stating that serious trouble might occur by reason of an attempt by a mob of over 1,000 miners from Strateville and Shawnee to drive colored miners away from that locality. The operators armed their colored miners, and proposed to protect their property, if possible. On the 19th the sheriff of Perry county ordered a company of militia to the scene, and later called on Gov. Foster for additional troops. In response to this call, Gov. Foster ordered parts of three companies of the Fourteenth Regiment, to proceed at once to Corning. In response to a riot alarm sounded by the Fire Department at 4 o'clock, these troops assembled at their armory, and left for Corning at 12 o'clock by special train. At 7:30 P. M., a telegram was received by the Adjutant-General stating that during the exchange of shots this evening between the militia and miners, three miners were known to have been wounded, but none of the militia were injured. A special to the *State Journal* says: This evening the miners charged on No. 3 mine on three sides. The troops opened fire on them, when an inglorious retreat was made. There are about ten wounded, nine of them seriously. While in retreat, shouting and shooting were going on promiscuously. At midnight a telegram was received by Assistant Adjutant-General Smith, stating that all was quiet and that no further trouble was anticipated.

On Thursday evening, a young man named Joseph McCulloch, aged 17, while working in a mine at Georgetown, El Dorado county, with his father, was caved upon, and before he could be rescued life was extinct.

Awards to Pacific Coast Inventors.

We are pleased to note among the exhibitors at the Mechanics' Institute fair, to whom premiums were awarded, a number of inventors for whose inventions the MINING AND SCIENTIFIC PRESS Patent Agency has procured patents. In looking over the list we observe that most of these patentees carried away, as they deserved, the medals in their classes.

The Rice straw-burning engine received a silver medal. This device is in extensive use on this coast and has been introduced in the East, and has proved itself a very useful invention.

Mr. Phillip Hinkle, a deservedly successful inventor, has received a silver medal for his hydraulic elevator.

Pacific Saw Manufacturing Company received a gold medal; Mr. N. W. Spaulding receiving a silver medal for his inserted saw tooth. This tooth is one of our best-known and most widely-used California inventions.

Mr. B. E. Henriksen, whose safety clutch for elevators, although a recently-patented invention, has been very rapidly introduced, took a silver medal; as also did Mr. Culver's patent pneumatic stop for elevators.

D. B. James' single-track railway, soon to be brought to practical test over a long road, obtained a silver medal.

Frellicher & Mahler took a silver medal for their new hand and foot-power washing machine.

Batchelor & Van Golder, of Sacramento, were awarded a bronze medal for their spring-tooth harrow.

Mr. Byron Jackson, an inventor who has turned his attention more particularly to agricultural implements, received a diploma for his light-weight horse fork, now extensively used in California harvest fields.

Mr. A. S. Hallidie, the well-known wire goods manufacturer, is among our foremost inventors, his attention having turned more especially to cable railroads and cable transportation. He received a gold medal for his wire rope goods, and a silver medal for his wire rope.

Mr. W. A. Wiester received a silver medal for his coal-nail stoves.

Messrs. Morris & Son, inventors of pneumatic signal devices, took a silver medal for their bronze door locks and hinges, and another silver medal for their pneumatic signal and annunciator.

Gladding & McBean carried off a silver medal for their sawer and drain pipe.

J. Browell, who has made a specialty of cement chimneys, received a silver medal for a chimney top.

Mr. E. J. Verrue, who has invented a hydraulic waste-pipe cleaner by which a drain pipe may be cleaned in the most effective manner, received a diploma.

Wilson's gas valve sewer trap took a silver medal.

Levake & Grubb received a bronze medal for their water closet.

Mr. Geo. H. Fuller, an inventor of important inventions in the construction of school furniture, received a silver medal.

P. Kelly, the "priza boot and shoe maker," received two medals; one for the combined boot and shoe, an important invention of great utility, and the other for hand-made shoes.

Wm. Sack, for a measuring device applied to tanks or water closets, received a silver medal.

Frank Laerman obtained a silver medal for the best sofa bed, which is quite a triumph, as the device is a new one, the first sofa beds made after the improved pattern being those exhibited at the fair.

Messrs. Hartshorn & McPhun received a silver medal for window shades and fixtures.

Mr. M. B. Dodge for his etono breaker and ore crusher obtained a silver medal.

E. F. Russell took a silver medal for his amalgamator.

Frank A. Huntington exhibited his new oscillating ore stamp, and was awarded a silver medal.

Foundry Notes.

The Pacific Iron Works have recently shipped a 20-stamp mill for the Boston & Arizona mining company, at Contention City, Arizona. This plant comprises the most expensive and complete mill yet constructed for the Territory.

Among other things recently shipped, or being constructed at these works, are a 60-ton Howell furnace and drier, and a set of hoisting works for the Silver Bow mining company, at Butte City, Montana; also a 65-ton Howell furnace and mill machinery for the Marsac mining company, at Park City, Utah; a 30-ton galena-ore furnace outfit for the San Xavier company, in Arizona; one for a New York company operating at Gila Bend, in Arizona; a 35-ton copper furnace equipment for the Martin & Ballard company, at Bisbee City, near Tucson, Arizona.

This firm makes a specialty of water-jacketed smelting furnaces, and have constructed all of this class of work now in use on the coast. They are just completing the machinery for the new propeller of the Eel River Navigation Company, which will be one of the most complete pieces of work of the kind ever made here.

Henriksen's Elevator Clutch.

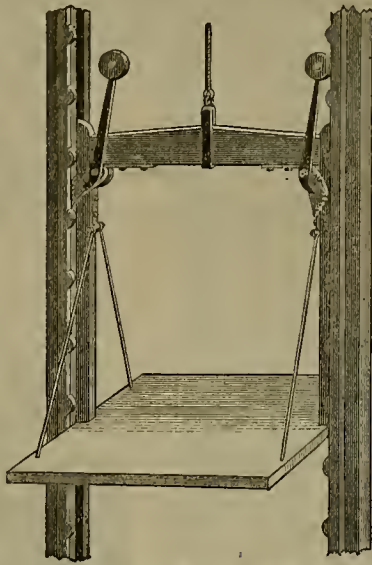
We illustrate beneath the improved safety clutch for elevators invented by B. E. Henriksen, of this city, and recently patented by him through the MINING AND SCIENTIFIC PRESS Patent Agency.

The safety clutch is a device intended to catch and sustain the cage in case the hoisting rope breaks or the hoisting apparatus is deranged. Trip levers are pivoted to the frame of the cage, and have toothed cams at their lower end. They are inclined outward, and have at their upper ends, rollers which bear against irregularly formed cleats or horses on the sides of the guide-posts. At the ordinary rate of speed these rollers move along on the edge of the cleats, these cleats being formed in wave lines. Should the cable part, or any portion of the machinery break, the rollers are brought in violent contact with the cleats, which, having a sharp incline on the top part, will throw the trip levers over, and bring the clutches or cams in violent contact with the guide-posts, so that they engage with them, and act as brakes or safety levers, preventing the cage from falling farther. The eccentrics, or cams, are toothed, and form a powerful brake, which increases in power in proportion to the strain which is brought upon them.

Mr. Henriksen has exhibited the workings of his device by loading the platform with 700 or 800 pounds of sand-bags. He first runs the elevator up and down at an ordinary rate of speed, to show how it works. Then he throws off the brake, so as to show how it operates in case of an accident to the rope or cylinder on which the rope winds.

The cage is instantly checked whenever the rope breaks. This form of clutch is to be preferred to those whose action depends upon springs. An instance is recorded in another column of loss of life from the non-action of the springs of a safety. This device is adapted for cages in mines as well as for elevators.

The operation of the device depends on speed alone. At the ordinary rate of speed the cams are not brought into action. The moment, however, that the speed becomes too great for safety, the trip levers operate, and the cage is stopped. This device is in use on elevators in the following buildings: Johnson building, No. 120 Sutter St.; Thurlow block; S. F. Stock Exchange; No. 545 Market St.; W. Cohn, northwest corner of Battery and Bush Sts.; W. J. Sloan, 545 Market St.; J. Ceri & Co., 517 Market St.; Halleck block; California Furniture Co., 226 Bush St., etc.



Henriksen's Clutch For Elevators.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

BREAKING CART.—De Witt C. Putnam, Pat. aluma, Cal. Patented Sept. 14, 1880. No. 232,207. This invention relates to certain improvements in that class of vehicles known as "breaking carts," in which young colts are broken to harness. Carts of this description are usually provided with very long shafts, and the seat is placed on springs immediately over the axle, or at such a distance back that the driver is not in danger of being kicked by a fractious animal. In this class of vehicles the foot-board is usually secured to the axle while the seat is on springs, and it is therefore uncomfortable to ride upon, since while the body of the occupant may move up and down his feet must remain stationary. The improvements consist in so attaching the foot-board to the vehicle that it shall move in unison with the seat, the same spring which supports the seat serving as a spring for the foot-board.

WIND-WHEEL.—John C. Preston, Arcata, Humboldt county, Cal. Patented Sept. 14, 1880. No. 232,205. This invention consists in forming an open skeleton-wheel revolving in a horizontal plane, and hinging on vertical rods a series of frames carrying the vanes or fans, these frames being adapted to swing edgewise to the wind on one side, but on the other side to be held by sliding movable lugs, so that their surfaces are exposed to the wind and the wheel caused to revolve and furnish power.

THERE are still 100 miners at work at the Cassiar mines, but steamboat navigation has closed on the Stickeen river for the season.

Another Mining Shaft Accident.

A very serious accident occurred last week at the Imperial mine shaft, on the Comstock, by which nine miners were killed. The cable broke, its safeties failed to work and a double-decker cage fell to the bottom of the shaft, only one of the ten men on it being saved. The 11 o'clock shift had gone down the south compartment on a double-decker cage, and the shift relieved got upon the cage at the 1300 station, which is at the bottom of the vertical shaft, to be hoisted to the surface.

The pumpmen, Richard Ryder, had an ax that had been left at the station the day before, and it is supposed that the ax was lying upon the deck of the cage. The Virginia Enterprise thinks it is probable that the ax slipped over the edge of the cage and caught under one of the timbers, and was thrown in such a way as to catch edge down between the cage and guide, thus forming a wedge which prevented the ascent of the cage, and caused the breaking of the cable. At all events, just at this point the cable was snapped at the reel in the hoisting works.

The engineer, B. F. Jones, says the cable snapped instantly, and the engine began running at such a speed that he could not tell whether it was in consequence of a sudden strain or even sea just where it broke. The cage fell like a shot to the bottom of the shaft, followed by 1,200 ft. of cable, but did not jump out of the guides. It fell with such momentum that it broke the chairs and went below the station, the upper deck stopping at the station level, and the cable coiling upon the floor. The shock was tremendous. Eight men were killed instantly by being thrown against the timbers and the cage and by the weight of the cable falling upon them. The bonnet of the cage was crushed and the decks bent out of shape, but the upper deck was not broken through. The men who were killed were horribly crushed some of their heads being mashed to a jelly and their necks broken.

As soon as possible after the accident help descended the next compartment to the scene of the disaster. It was, however, some time before the men could be extricated. When relieved John Roach and Frank Smith were found to be alive, and Roach talked a little quite rationally. In taking him to the surface he weakened rapidly, and lived only to get to the top.

Following are the names of the killed: John Roach—Single man; both legs broken and side crushed in; died of internal injuries.

Patrick Murphy—Single; literally disembowled, thigh

smashed and skull crushed in.

Richard Ryder—Single; head cleft from crown to eyebrows, shoulder torn nearly off, and the blade driven into his body.

Thomas Meagher—Leavee wife and five children near the Homestead; head crushed and brain all gone; badly bruised all over.

Mat. Winnia—Married; three children; top of head all gone; right arm crushed and nearly torn off; badly bruised.

Joseph Hanrahan—Single; face cut and badly bruised; injuries mostly internal.

William Corbett—Single; head smashed in; upper and back portions of body badly broken and bowels out.

N. B. Farnum—Single; legs badly bruised; injuries internal; most of body black and blue with bruises.

Jerry Sullivan—Leavee wife and three children; head badly cut and bruised all over.

Frank Smith, the only man who was saved, was standing on the upper deck, and when the cage began falling, caught hold of the crossbar with both hands and raised himself clear of everything. His presence of mind saved his life. Of course he was thrown violently to the floor when the cage stopped, and was badly bruised from head to foot.

The cause of the cage falling is referred to elsewhere in these columns. It was due to the non-action of the safety clutches.

NORWAY is talking of cutting loose from Sweden and setting up a republic. The Norwegian Parliament insists upon its right to summon the ministers of the Kingdom before it. The ministers having refused, the Storting passed a bill declaring in few words that "the King's ministers ought to sit and speak in the Storting." The bill was promptly vetoed by King Oscar. The Norwegian constitution provides that the king may veto a measure three times, but that if it passes a fourth time it shall have the force of law without his approval. Although the king dissolved the Parliament, the bill has been carried four times, and now his Majesty rests his refusal to allow it to become law on his prerogative.

Iron Linings for Mining Shafts.

Among the late improvements for shaft sinking in vogue in Europe is a shaft-boring apparatus used in connection with iron-lined shafts. Dr. A. Gurlt, of Bonn, describes, in *Iron*, an apparatus of this kind exhibited at the Düsseldorf exposition. The Kind-Chaudron system was successfully employed by director Bruno Schutz in sinking five shafts at the Dahlbusch colliery through the water-bearing marl of the Cretaceous formation, which overlies the coal measures, while by the Lippman system the shaft of Konigsborn colliery, near Unna, was lately completed with full success and under similar circumstances. Shaft-boring machinery and iron tubing for securing the shafts are specialties of the firm of Haniel & Lueg. The borer which had done the work at Konigsborn, and which alone weighs 21 tons, was exhibited *in natura*. It has the diameter of the whole shaft, and by being lifted and dropped alternately under water it disintegrates the bottom of the shaft, while it leaves the sides entirely unharmed, and the water filling the shaft exerts a counter-pressure upon them. The Kind-Chaudron system, which has lately come into use at the Mansfeld silver and copper mines, differs from the former in so far as in the center of the shaft a wide bore hole, but of very much less diameter than that of the shaft, goes in advance, and the ring of rock which remains around it is then bored out, when all disintegrated rock collects in the middle hole, from which it is easily brought to surface by the so-called ladle. Shaft boring has proved to be particularly advantageous whenever the rocks which shall be reached are covered by thick water-bearing strata, as for instance of the Cretaceous formation in the north of France, in a part of Belgium and Westphalia. By the Kind-Chaudron system no less than 18 shafts in France, 11 in Belgium and 5 in Westphalia were sunk in this manner in less time and with less cost as would have been possible in the ordinary manner of sinking.

Bored shafts are necessarily round, and for their security they require an inner lining either with masonry or iron. The method of lining with iron or tubing is generally adopted, and large cast-iron rings are let down in the pit and are most accurately piled one upon the other until they reach the surface. The space necessarily left between the tubing and the rock is then filled with cement or concrete in order to make it water-tight, and after it has hardened the water is pumped out, and the bottom of the shaft becomes for the first time accessible. Such huge cast-iron shaftings for the Seegangottes shaft, near Eiselen, were exhibited by Haniel & Lueg; they were 4 meters diameter, 1.5 meter high and weigh 10 tons each.

For shafts which can be sunk without much water in the ordinary way, a different system of tubing with cast-iron segments came first into use in the north of England, and in 1856 it was introduced by an English miner, Wm. Coulson, to the Hibernia colliery in Westphalia. Coulson was an illiterate, self-made man, but first-rate in sinking and tubing shafts; and when he died, not long ago, he had sunk and tubed no fewer than 23 shafts in England and 5 in Westphalia. Since then the English system has been largely adopted, and cast-iron segments or tubings were exhibited by Haniel & Lueg, and by H. Horlobe, of Ruhrort. They are 1.30 to 1.33 meters long, 0.60 to 0.64 meters high, and provided with flanges all round, and with ribs on their inner side. Another kind of securing round shafts with rings made from shaped wrought iron, has of late found much favor in several continental mining districts. The Phoenix iron and steel company, however, showed the iron pit-lining *in natura*, by producing a system of two rings which have 5 inches diameter; the rings are connected by eight struts, one meter long, and by two large cross beams of double T iron. They are divided in three compartments, when the middle compartment is again divided by two short iron beams in a large section in the middle and a small one at each end. The cross beams not only strengthen the pit-rings, but at the same time they are intended for separating the pumps from the shafts, and for offering facilities to fasten the pumps and guide-rods for the cages truly and securely.

YUNG KWAI, the Chinese boy who was graduated from the Springfield (Mass.) high school last June with the salutatory address, became a Christian, and wrote home about it to his father, who is one of the highest of the Chinese nobles, though not of royal blood. The father wrote a very indignant letter and ordered him to return home, threatening to starve and beat him into renouncing his views. As the boy was determined to be true to his new faith, he looked upon his return to China as going to almost certain death; but he started quietly with other boys for Boston, whence they were to sail for home by way of Europe. Yung Kwai, however, stepped from the train in Springfield, and that is the last that has been seen of him. If he succeeds in keeping hidden for a year, he will then be 21, and can become a citizen of the United States.

It is now alleged that the use of Gen. Grant's name with the Presidency of the San Pedro and Canyon del Agua Mining Co., of New Mexico, was only a stock-jobbing operation of the managers, who profited largely by it.

Outlandish Dress in England.

It is not surprising that a large crowd should have collected, that ladies were shocked and policemen scandalized, by the appearance lately in the Strand near the Vaudeville theater, at midnight, of a young man dressed in a suit of bed-chintz of various colors. A high-crowned hat completed the costume of this fantastic individual, whose eye-brows were painted black, while the lower part of the face was daubed with red, and who carried an umbrella in one hand and a rifle in the other, in addition to a sword and pistol in his waist belt. The young man was arrested, and when charged the following morning at Bow street with "disorderly conduct," his defence was that he had made a bet of five pounds with a friend, seemingly as brainless as himself, that he would walk from the Criterion to the Gaiety theater in any costume which his friend might prescribe without being molested by the police. Mr. Vaughan eternally reprehended the inopportune masquerader, and ordered him to find one surety in £20 for his good behavior for six months.

Sociologically, the offence of this silly youth was a dual one. He had not only caused an obstruction in a public thoroughfare, but he had committed that which, in England, is deemed a very flagitious offense. He had appeared in an unaccustomed garb. On the other hand, he might, with perfect immunity, at high noon as well as at midnight, in Regent street or in the Strand, at an aristocratic garden party or in the presence of royalty itself, appear in a costume somewhat like the following: A wooden cap with an eagle's feather and silver aigrette in the form of a thistle; a boy's jacket ornamented with many buttons; a short petticoat, fantastically chequered in "various colors;" bare legs; plaid worsted hose with a knife and fork at one garter and a spoon at the other; and hanging before him at his waist a goatskin pouch decorated with tassels or tails of black horse-hair. At his side he might have worn a broadsword, and in his belt a dagger and pistol. That is the Highland dress. When it was assumed by George IV, at Edinburgh, in 1820, the "garb of old gaul" excited much merriment, which rose to uproarious hilarity when Sir William Curtis, the banker, who was as fat and as vain as the King himself, appeared in similarly preposterous attire. Nobody laughed at the Highland dress nowadays. It is worn indiscriminately by officers in the Highland regiments, by gillies, by affluent English tradesmen who have hired shootings or fishings in Scotland, and by the children of discontented rich people. It is an uncouth and barbarous garb, but we have grown accustomed to it.—*Pall Mall Gazette*.

A REMARKABLE CASE.—Scarcely less astonishing than Dr. Tanner's recent feat of fasting, remarked the N. Y. *Evening Mail*, is the condition of a young lady, daughter of the Mayor of Grambske, a village near Bremen, who is said to have been fast asleep ever since the second week in January with the exception of a few hours of semi-wakefulness at intervals of from six to eight weeks. An interesting account of her extraordinary estate is published in the *Hanover Courier*. It appears that she lies, plunged in a profound slumber and entirely unconscious of all that goes on around her, night and day, reclining on her left side, warmly covered up and with a light gauze spread over her head. Nourishment, chiefly in a liquid form, is daily administered to her, which she swallows without awaking for a second. She is a pretty, slender girl, of a pallid complexion, but she does not lose in weight during her trances of from forty to sixty days, and when awake exhibits a cheerful disposition and an eager desire to perform such small household tasks as her strength enables her to fulfil. Her father is a well-to-do man, who has consulted several eminent medical men in the hope of discovering some remedy for his daughter's abnormal condition, which entails serious inconvenience and constant anxiety upon the other members of his family, but all efforts hitherto made to keep the unlucky girl awake have resulted in total failure.

THE FASTEST TORPEDO BOAT.—The Russian government a few months ago gave orders to a firm at Bristol to construct for it a torpedo boat, 60 ft. in length, 7 ft. in width and 5 ft. in depth, stipulating at the same time that she should make 18 knots per hour on a trial trip before she would be accepted. The boat was finished a few weeks ago, and Mr. Geo. R. Dunell, of England, who is here as the representative of the Russian government in the matter, made a trip in her on Wednesday, September 1st, on Narragansett bay. On a 6-knot run she attained a speed of 19.87 knots, or about 23 statute miles, and she was immediately accepted by Mr. Dunell. An hour later she started for this port and was shipped to Europe on the steamship *Holland*, of the National line. She is said to be 3½ knots better than any torpedo boat of her size built up to the present time.—*Iron Age*.

PROF. CHARLES RAU, archaeologist of the Smithsonian Institution at Washington, has, at the special request of Prof. Leon de Rosny, President, accepted the title of Delegate of the Institution Ethnographique of France. This distinction is conferred in recognition of Prof. Rau's eminent services to ethnographic science. The Institution Ethnographique comprises various societies, one of which has for its object, exclusively, the study of American archaeology and ethnology.

The Color-Blind Scare.

Connecticut is, we believe, the first State to pass a law prescribing certain regulations to be observed by railroad companies in regard to this subject. If all the other States should follow suit, and each of them enact a law as crude, vexatious, unjust and annoying as this pioneer specimen, the skilled ophthalmic experts all over the land may safely count upon having a good time, however it may be with locomotive engineers and others who have rendered long and acceptable service upon our best managed roads. There is sure to be blundering, short-sighted work, when legislators who have no practical and scarcely any correct theoretical knowledge of railroad operation, undertake to remedy supposed defects in the system which in some unaccountable way have escaped the notice of the shrewdest and most capable managers; and the liability to blunder is none the less when the mercenary greed of a selected corps of professional experts is to be satiated at the rate of two dollars a head for the great army of railway employees whose duties require them to have anything to do with the form and color of signals. And so the companies must be taken in hand, and reliable and long-tried engineers who have never had an accident on the road, driven from service because they can't read letters three-eighths of an inch long at a distance of 25 ft., or sort colored worsteds in a scientific manner, or see red and green precisely as some other people do, although they are able to discriminate just as sharply between the two, and be as little liable to confound or mistake one for the other. The logic of facts shows conclusively that the danger from color blindness, about which such a hue-and-cry has been raised, is greatly exaggerated, and that in no single one of the many careful and searching investigations that have been in all the past history of railroads, has the cause of an accident been traced to color-blindness, nor has this particular cause even been suggested or suspected, so far as we have been able to ascertain from the record.—*National Car Builder*.

STEAM DREDGING FOR OYSTERS.—Geo. M. Grave, of Oyster Point, New Haven, has now in process of construction an oyster boat designed for steam dredging. She is 71 ft. long, 17 ft. beam and 6 ft. deep, her engine 30-horse power and her screw propeller 53 inches. The boiler is on board and the work is being pushed as rapidly as possible. There is an over deck from 7 to 9 ft. high made water tight. In the side of this over deck, in a line with the main hatchway, are openings, 6 by 8 ft., which when dredging open inwardly and are hooked to the ceiling. Through these openings the dredging is done by steam, saving the weary "back breaking" that attends dredging in the ordinary sailboat. Forward is the fore-castle in which are berths or bunks for the crew. Directly over this is the pilot house, and back of this the captain's quarters. The expense of running this steamer is for fuel not over \$1 per day, 6 men at \$15 to \$20 per month for each. She will dredge in a day from 700 to 1,000 bushels, taking at each lift 12 or 15 hushels, while the sailing boat at each lift will not get more than a hushel or two at once, and during the day will be doing extremely well if she gathers 40 or 50 bushels.—*Sea World*.

A NEEDED PROTECTION.—It has just come to light that several years ago the Iowa Legislature passed a bill incorporating the Iowa Ministers' Mutual Protective Association, and providing that what personsoever, without regard to age, sex, rank, color or previous condition of servitude, including Indians not taxed, should present any clergyman, of whatever denomination, Catholic or Protestant, be he settled as pastor of a church or employed in any capacity by any religious, educational, publishing or missionary institution or association, or merely lying around loose looking for a church, or bushwhacking through the country as a star evangelist, a so-called pair of embroidered slippers, whereof one slipper should be a number three, C last, embroidered in green and yellow and with a high, slim heel, and the other, its alleged mate, should be a number fourteen, D last, embroidered in red and blue, with no heel whatever, should be deemed guilty of an assault with intent to commit bodily injury, and should be punished by fine or imprisonment, or both, one-half the fine to go to the complainant.—*N. Y. Mail*.

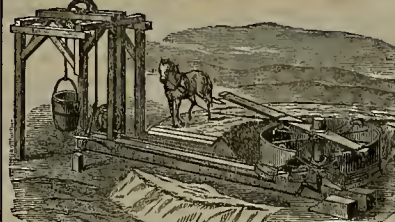
PART of the city of Deadwood, Dak., is claimed by placer miners under the mineral land act, and they want to wash out the foundations of houses, to which the owners of surface plots protest. The case has been decided in favor of the miners in the General Land Office, and the surface owners have appealed to the Secretary of the Interior. Under the law, if the land is more valuable for minerals than agriculture, it can be entered as a mineral land, and this seems to be the case with corner lots at Deadwood.

M. CAMILLE FLAMMARION, the popular French astronomer, who has been making several balloon ascents of late, says that he did not feel any giddiness, but that he felt a vague desire to fling himself out of the car. Although convinced of my immediate death, he says, "I felt a gentle temptation to let myself fall, and my own death became indifferent to me. But happily it is one of those temptations which can be resisted."

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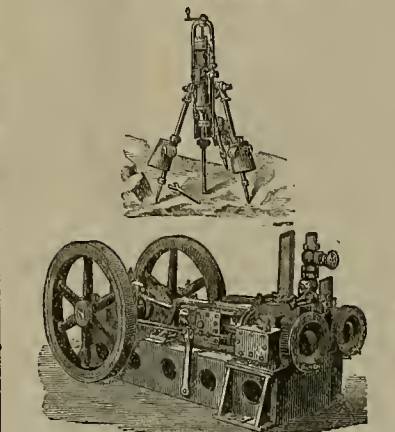


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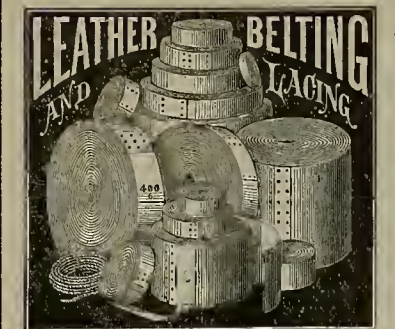


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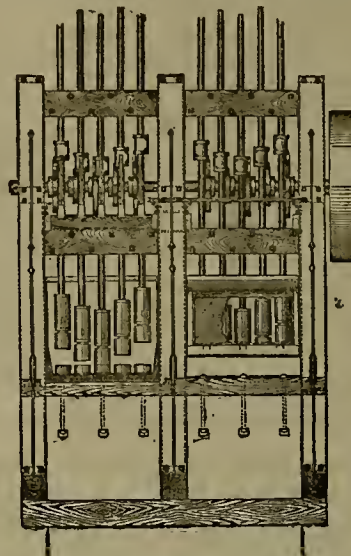
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Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Napa Consolidated Quicksilver Mining Co.

SAN FRANCISCO, SEPTEMBER 21, 1880.

At a meeting of the Board or Directors of the above named Company, held this day, a dividend (No. 13) of Ten (10) Cents per share was declared, payable on WEDNESDAY, the 22d day of September, 1880, at the office of the Company, Room 16, Academy Building, No. 330 Pine street, San Francisco, California.

WM. W. PARRISH, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,
Nevada Block, Room 37, S. F., September 15th, 1880.

At a meeting of the Board of Directors of the above named Company held this day, a Dividend (No. 55) of Fifty (50) Cents per share was declared, payable on MONDAY, the 20th day of September, 1880. Transfer books closed until the 21st instant.

W. W. TRAYLOR, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,

SAN FRANCISCO, SEPTEMBER 10, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, dividend (No. 35) of Fifty (50) Cents per share, was declared payable on WEDNESDAY, September 15th, 1880. Transfer books closed until Thursday, September 16th, 1880.

WILLIAM WILLIS, Secretary.

Office—Room No. 29 Nevada Block, No. 301 Montgomery street, San Francisco, Cal.

ANNUAL MEETING.

The regular annual meeting of the stockholders of the Spaulding Gold and Silver Mining Company will be held at the office of the Company, No. 117 Battery street, San Francisco, California, on TUESDAY, the Twelfth (12) day of October, 1880, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may properly come before the meeting. Transfer books will close on Friday, the Eighth (8) day of October, at 12 o'clock M., until after the meeting.

JOHN HEIN, Secretary.

Office—No. 117 Battery street, San Francisco, Cal.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 43), levied on the Eleventh day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Ellis, H. C.	226	250	\$ 50 00
Hulme, Eliza J.	245	500	100 00
James, James.	65	63	12 00
James, Frederick.	381	62	12 40
McAfee, Wm.	200	500	100 00
McAfee, Wm.	201	500	100 00
McAfee, Wm.	202	100	20 00
Miller, W. J., Trustee.	243	1750	350 00
Miller, Eliza J.	391	500	100 00
Morgan, W. S., Trustee.	386	1000	200 00
Morgan, W. S., Trustee.	387	1000	200 00
Morgan, W. S., Trustee.	388	2000	400 00
Oates, Wm.	67	100	20 00
Oates, John.	68	125	25 00
Ream, Charles.	72	50	10 00
Ream, Charles.	73	50	10 00
Ream, Charles.	74	50	10 00
Sanborn, F. G.	385	250	50 00
Skinner, Maria.	384	250	50 00

And in accordance with law, and an order of the Board of Directors, made on the Eleventh day of August, 1880, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, No. 402 Front street, room 8, San Francisco, Cal., on Monday, the Eleventh day of October, 1880, at the hour of one o'clock P. M. of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

W. O. WILSON, Secretary.

Office—402 Front street, Room 8, San Francisco, Cal.

Techattup Silver and Gold Mining Co. Location of principal place of business, San Francisco, California. Location of works, El Dorado canyon, Lincoln Co., Nevada.

Notice is hereby given that at a meeting of the Trustees, held on the 24th day of August A. D. 1880, an assessment (No. 7) of One Dollar per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, No. 237 First street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of September, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 20th day of October, A. D. 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

O. F. MOULTROP, Secretary.

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H. C. PERKINS, Supt.

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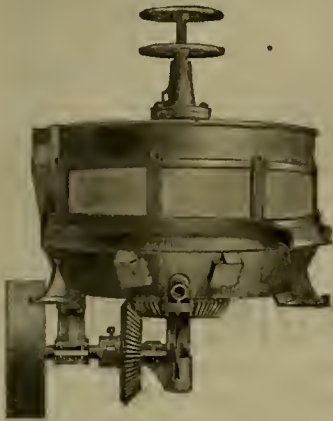
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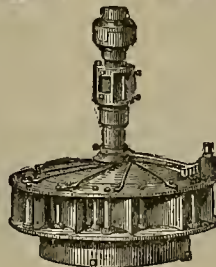
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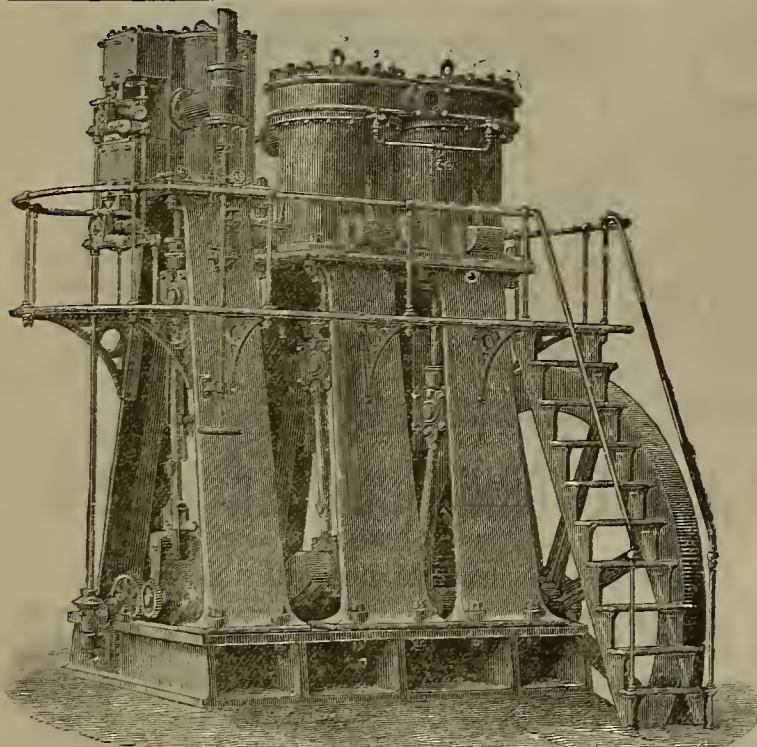
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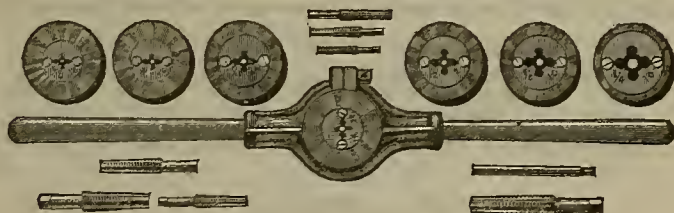
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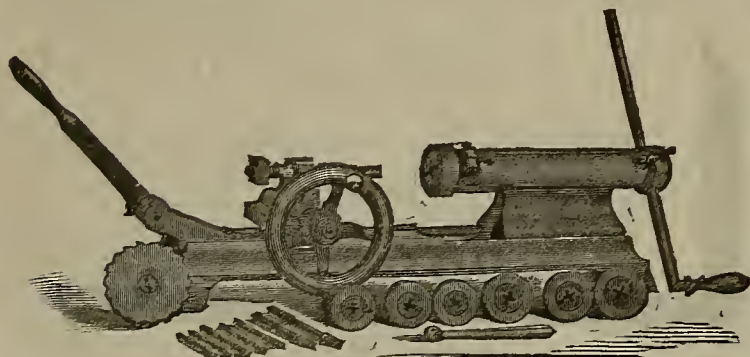
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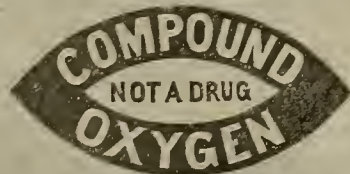


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MINING AND SCIENTIFIC PRESS.

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BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, OCTOBER 2, 1880.

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Number 14.

A New Ore Battery.

We illustrate on this page the new Reliance Ore Battery, devised by E. T. Steen, of No. 10 Bush street, this city, and which was on exhibition in running order at the late Mechanics' fair. It is constructed specially for high speed any desired number of blows per minute being possible, a result which cannot be obtained with the ordinary stamp battery when cams and tappets are used.

In this battery each stamp runs from 150 to 400 strokes per minute. Figure 1 shows a general view of the battery; and figure 2 is a section through the air-cushion cylinder. A is the cylinder, B the piston which is welded on to the stamp stem, C, this stamp-stem being provided with the usual stamp and shoe. D is the leather packing through which the stem plays. The small hole, G, in the center of the side of the cylinder is the air inlet. The screw, E, is intended for adjusting the blow, and also allows the cylinder to be lowered as the shoes and dies wear away. The connecting rod, F, connects the device with the eccentric in the driving shaft; this driving shaft being run by a belt in the ordinary way.

As the cylinder, A, is raised by the connecting rod, F, and the air-hole, G, comes above the piston, B, the air in the cylinder below the piston becomes compressed until the stamp is raised. The driving shaft is run rapidly, so there is a momentum given to the stamp, stamp-stem and piston. As the cylinder is pushed down the piston, B, will continue to rise until having passed the hole, G, the air is compressed above sufficiently to stop the ascent of the stamp, and throw it down with great force. In effect there is an elastic air cushion above and below the piston; this air being compressed at each stroke by the momentum given to the stem and piston.

The object of this construction is to do away with cams and tappets and make such a connection between the driving shaft and stamp as will admit of high speed without rigid connections. The stamp will accommodate itself to the amount of ore in the battery, the same as an ordinary stamp mill, while at the same time it is directly connected with its driving shaft.

This battery is quite portable; the weight of all the iron and wood work, except the mortar block, for a battery of two stamps of eight inches diameter, is only 5,400 lbs.; weight of the Victor ore feeder, sold with the battery, 500 lbs. Mr. Steen estimates the capacity of the two stamps driven in this way as equal to that of eight ordinary stamps (the iron work of which would weigh about 16,000 lbs.)—the saving of freight is considerable. It can be run with any kind of power. There is not any jar, as the stems are connected by air cushions as described.

This mill will take rock up to two and a half inches. It is not only a prospecting mill, but suitable for large mines in full work. Three sizes are made, which are sold for \$600 to \$1,200, including a Victor ore feeder, the whole being ready to set up. This will include all the iron and wood work, except the mortar block. Mr. Steen claims that this is very much less liable to get out of order than the common cam mill. Water is run through the shaft and the air-cushion guides to keep them from heating by the rapid motion. This water is then passed to the battery.

MORE ECONOMICAL.—The Utah mine on the Comstock is more economically run. The cost of the east drift on the 1950 level does not exceed \$8 per foot. The water, most of which comes in at the 1150 level, is carried through pipes along the 1350 level, then raised by its own pressure behind to the 1250 level, from which connection is made with the 1500 of Sierra Nevada. It flows along this level and through to the Suto tunnel therefrom. This saves at least \$50 per day in wood.

An exchange says: At Soulshyville the new Williams process for treating rebellious ores is a perfect success, and bids fair to make a revolution in the treatment of rebellious metals. The furnace is in good working order, and the tests have all proved favorable. Won't some one tell us what the Williams process is?

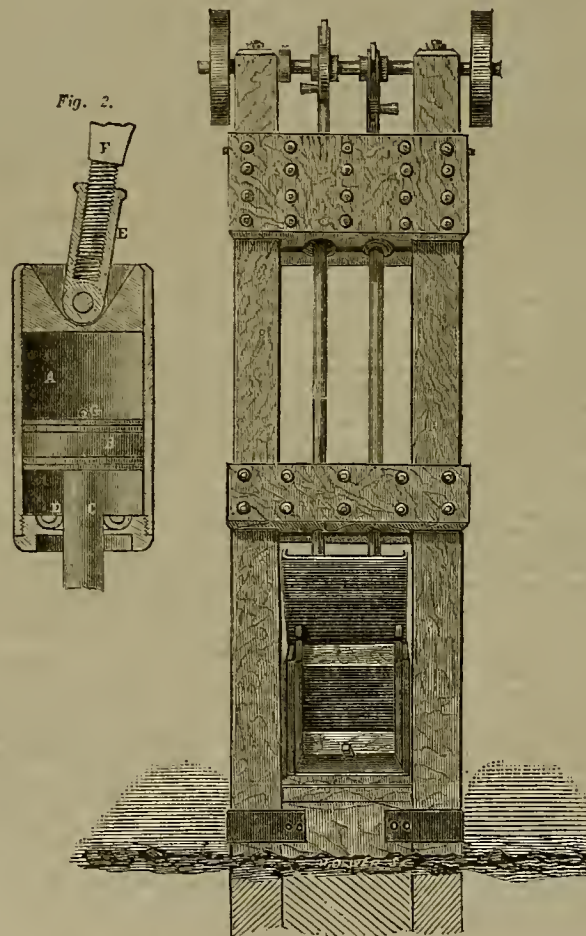
Mining or "Lawing."

We see by late English journals that the Emma Mining Company has made up its mind to give up "lawing" and go mining. In consequence of this resolution the shares, according to quotations in the *Mining World*, have gone from 5 to 30 shillings. The officers of the company have for a long time been conducting proceedings in the courts in a most persevering manner. The suits have not, however, been productive of any great financial results, and the stock kept on going down till it reached a mere nominal value.

P. to be transferred to the new company, for which Mr. P. should receive one-seventh of the shares; all litigation and claims to be put an end to. The meeting was unanimously of opinion such offer ought to be accepted, and considered it a very liberal one, and were much indebted to Baron Grant, through whom it has been brought about. In the result a deputation was appointed to wait upon Mr. McDougal and represent to him the views of the meeting.

The *World* in commenting on the subject says: "It must be admitted that by 'explorations' in the law courts it is possible to gratify the acrimonious feelings born of disappointment, but that so far as any pecuniary result is concerned, the only hope lies in a vigorous devel-

Fig. 1.



STEEN'S RELIANCE ORE BATTERY.

final quotation. That the shareholders believed more could be made out of the mine than in the courts is evidenced by the fact of the rise in price as soon as it was determined to go to work with pick and shovel instead of pen and brief.

At a private meeting of the members of the Stock Exchange, shareholders in the Emma mine, held lately in London, Mr. Gager, on behalf of Mr. Park, the American vendor of the mine, attended and made a long statement setting forth the great value of the mine, and also that Mr. P. (who by telegram stated that he would confirm anything Mr. G. might recommend), in his opinion, would agree to give up the mine with all the new machinery, which is of the most powerful character that America can produce, and capable of sinking 1,000 feet below the lowest of the old workings, and to constitute a new company, with a capital of £700,000, distributing six-sevenths of the shares among the present existing shareholders and debenture-holders, he (Mr. P.) finding £24,000 for working capital, which he agreed to subscribe in shares of the new company at par, and also to find £20,000 in cash to be given to the debenture-holders; the mine now held by Mr.

opment of the mines. Mr. Park believes that such an exploration will be successful, or he is not the man to put down £24,000 for working the property. He knows better, perhaps, than any of the shareholders that the Emma has never been properly developed. What would be done with a mine in this country which had only been worked for 300 ft., and which yet had yielded \$800,000 in silver ore? Why, fresh capital would be at once forthcoming, because it would be argued, and argued on the basis of all mining experience, that a mine that had done so well in the shallow must do far better in the deep. If a mine, either here or in America, should give out at 300 ft., then all mining precedent must be set at defiance, but such a coincidence is unknown in both countries, and therefore it may be taken as a matter almost of certainty that further explorations in the deeper levels will yield results such as would eclipse those formerly experienced when quarterly dividends were wont to be paid. On the spot, too, as already intimated, there exists a vast quantity of most valuable machinery which has been at work on the mine since August 4th."

New Mode of Blasting.

A new method of tunnel or drift driving, invented by Capt. Penrice, now in use at Montecan, and also recently at the St. Gothard tunnel, is worthy of trial here, as it is said to produce wonderful results in point of speed and expense. Capt. Penrice placed four boring-machines of great power on a carriage, and set them to drill holes simultaneously 13 to 16 ft. in depth and 2 in. in diameter. The arrangement of the drive was triangular, three of the holes being placed in a row at the base and one in the apex at the back of the level. The center of the three bottom holes was first charged with dynamite or "Gomme-Gelatine," for three-fourths of its length. This explosive enlarged the hole to 4 inches in diameter, the rock being blown out in fine dust. A second charge, still more powerful, enlarged the hole in the same way to 9 inches, and a third, if necessary, brought it up to 13. The two holes on each side were then charged and fired, and the line of least resistance being towards the long "pocket" formed by the first hole, the sides were crushed in, and a kind of cave formed, extending the whole depth of the holes—about 18 inches high and 6 ft. wide. Then the top hole was fired, and the heading "won." The explosion, in this way, was calculated to form a gallery 5½ ft. wide and 5½ ft. high, sufficient for the working of the machine.

Mr. Taylor, who described this system at the recent annual meeting of the Royal Cornwall Polytechnic Society, said that results of this kind had been obtained in the course of experiments on the system at the Mines de Blanz, when the cost of winning a heading for about 7 ft. 4 in. was about £5 4s., of which the dynamite used cost £4. There was the cost for labor and materials extending over 34 hours, 31 of which were employed in drilling the holes, and 3 in blasting and removing the debris. Capt. Penrice claimed that his machine could win the four holes in two hours; but allowing four, it was estimated that in seven hours 6½ ft. of heading would be won, and in 24 hours 20 ft. Ten ft. was said to be easily bored in 16 to 18 minutes. By the insertion of a small tube in each drill, water was conveyed under pressure to the cutting edges.

Mining Superintendents.

We noticed this week the statement of a Montana correspondent that a mining company of Rochester, N. Y., owning property in the Territory, had never yet made a success, although having good mines. The reasons given for their failures was the inefficiency of their superintendents. First, they sent out to take this responsible position a street contractor; next, a merchant-tailor, and then a drygoods clerk.

With this heavy handicapping it is no wonder the mines did not pay; but the case is by no means, unfortunately, an isolated one. There are many similar results from corresponding causes. It is probable that Eastern mining investors will have to learn all these things by experience, as we "Pacific Coasters" have done, since they will not take our experience. Of course many have learned by this time that it is foolish to expect inexperienced men to take charge of mines. Others, however, believe that with good working miners, any one can "hoss the job" and make a success of the mine. The people that think that way are more apt to put money into the ground than take it out.

An incapable mining superintendent can do more harm and spend more money uselessly in a shorter time than any other individual can hope to do legitimately. One of that kind will demoralize a whole camp. If in charge of a big mine—on which much of the prosperity of a camp depends—his had management not only injures the mine, but the camp also.

In fact, too great care cannot be exercised in the selection of the superintendent of the mine. His position is by far the most important one there is to fill, for upon his shoulders often depends the success of the whole venture.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EWS

Miner's Peak, Tulare County.

Distant View of Mount Whitney—Grand Mountain Scenery.

[Written for the Press by J. W. A. WRIGHT.]

This sketch will give the readers of the PRESS a brief account of the ascent of Miner's peak, in the high Sierra, near Mineral King mining district, Tulare county, with an outline of its surroundings and its relations to more noted peaks and domes which form, in its immediate neighborhood, the highest mountain masses in the United States outside of Alaska.

This huge "saw-tooth" is distinctly seen in the clear day of winter and spring, or any cloudless morning, between daybreak and sunrise, from any point in Tulare and Fresno counties for about a hundred miles along the line of railroad. It is like an immense tent capping the mountains. Its top appears but little, if any, lower than the highest of the numerous peaks that are so clear-cut against the morning horizon, for the reason that peaks really higher are from 1 to 15 miles farther east, or more distant. From Hanford this fine peak is 64 miles in a straight line, about 10° north of east. From the town of Mineral King it is in full view about three miles in a straight line to eastward. Its summit can be reached by several routes, according to the object to be accomplished. By the most direct routes, up the deep and very picturesque gorge known as

Monarch Canyon,

You must travel not less than five or six miles to reach its lofty top. Of this distance you can ride about three miles, if you wish, but you have a trail for little more than the first mile. With a safe guide there is no very precipitous or dangerous climbing such as friend Lsmon eo graphically describes in his ascent of Mount Shasta; but it is tough, wearisome work, riding or walking. This fact can be at once appreciated when you remember that in three miles horizontal distance from town you make a mile or more in perpendicular height; for the townsite being about 7,500 ft. above sea level, the top of

Miner's Peak

is scarcely less than 5,500 or 6,000 ft. higher. Could we have had a good aneroid in that very interesting mountain region, its altitude could be given more definitely, but, much to our regret, we were disappointed in getting one, as we intended. The only means by which we could approximately estimate its height, were: First, comparing it, when on its summit, with Kaweah and other peaks that were known to be 14,000 ft. high and upward; and second, its great elevation above the last trees we passed—*pinus contorta*, or hack-ma-tack. Near Mammoth City these trees disappear at altitudes of 11,000 ft., as we found from barometrical and other measurements last summer. A degree of latitude and more farther south, as Miner's peak is, these pines are likely to flourish even above the altitude of 11,000 ft.

As our party, which made the ascent July 27th last, all agreed that the perpendicular height of the summit above the last timber must be at least 2,000 or 2,500 ft., we concluded that 13,000 or 13,500 ft. make a fair approximation for the altitude of Miner's peak. The entire ascent from Mineral King flat and back is made in from 10 to 12 hours' climbing, allowing an hour or two to spend on the summit and enjoy to the full

The Magnificent Panorama of Mountain Scenery

That is unfolded on every side. My six companions, on the day in question, were all Tulare county men. They were Joe C. Palmer (who served in the Union army during the war under Gen. George S. Evans) and W. B. Wallace, well-known mountaineers and prospectors, with Jacob Rynerson, Wm. D. James, Wm. E. Wild and Spier Jackson, of Visalia.

After an expenditure of muscle and breath and will that none can appreciate until they have tried it, we were all gathered between 3 and 4 p. m. in a cosy little niche on the summit, formed by massive granite elahs. These great rock masses, of almost every form and size, were piled upon each other in utter confusion for the last 1,000 ft. and more in elevation, and the last mile of our rough route. A few moments of rest and the thrilling view of the grand scenery around us soon removed entirely all the feeling of exhaustion and occasional giddiness, with which we were almost overcome at times by the extreme rarity of the atmosphere and the very hard climbing during the last mile among the trackless rocks, and over the coarse yielding sand into which these myriads of granite masses are constantly crumbling, by the action of the elements, without ever seeming to become fewer or smaller.

Immediately around us, within a circuit of four miles, were at least five yawning abysses, with bare, craggy, precipitous sides, and beyond them deeper and more gradual depressions, the bottoms of which lay from 2,000 to 6,000 ft. below us. The town and valley of Mineral King were in full view to westward, nestling

serenely and bewitchingly in the profound calmness of the bright mountain sunshine.

The Impressive Stillness of Death

Reigned supreme everywhere around us; broken only by our own voices and the low, whirling among the rocks of a brisk breeze from the northwest, varied occasionally by the sudden crash and roar of loosened rocks that dashed down some deep chasm near us, and reverberated with startling echoes from numberless precipices. In the deep gorges nearest us, we counted on all sides nine lakes from 200 yards to half a mile long. Their emerald-green waters were usually half concealed with ice and snow, and broad snow patches covered the rocky terraces and ravines around them. Looking far to westward and southwest, over a barren rocky ridge, two or three miles from us, with peaks whose tops were only from 500 to 2,000 ft. below us, we could faintly see the broad Tulare plains, the dark lines of timber along King's, Kaweah and Tule rivers, the lighter-colored spots of our grain fields, the dull-whitish surface of Tulare lake, and the outline of the Coast Range, dimly appearing through the dense haze that enveloped everything in that direction. A mile or two southwest of us were two fine granite peaks but little lower than our point of observation. Their white, precipitous sides, devoid of timber, were separated from us by a wild, deep gorge where one or two picturesque lakes, encased in snow, find an outlet for their waters through the Kern.

On its north side, Miner's peak breaks off into a broad, sheer precipice full 3,000 ft. to the surface of

Cliff Canyon and Columbia Lake.

This rough gorge, with its deep, mysterious-looking lake, covering perhaps more than 100 acres, is simply superb. The whole view for at least three miles in that direction is the wildest of the wild. It is weird, awe-inspiring, fascinating. Your eyes, once turned there, seem riveted to its unique features by an indescribable charm. Beyond the terrace-like bottom of Cliff canyon, scarcely a mile across, is still another gorge, an impenetrable canyon, so narrow, deep and precipitous, that the eye seeks in vain to fathom its depths, as you peer into it, from the apex of Miner's peak. The profound impression made upon you by the misty yet transparent atmosphere, the unmeasured, uncertain depth, and the tomb-like silence of that vast mountain solitude, as you feast the eye upon its varied features, its rock masses of many colors—unclad above except by snow, yet densely covered with pines, and firs and cedars along their bases; all this and much more leave

Indelible Memories.

Second only to those that remain through life, with all who have once looked into Yosemite valley from Glacier point. By common consent of our companions on this excursion, we named its lake Columbia, not only for the usual pleasant associations with the name, but especially in commemoration of the exquisitely beautiful huff or light yellow columbines first found by us in making the ascent at altitudes of about 12,000 ft. These charming flowers and rich purple primroses (*primula*) were found in company around the edges of many granite boulders, blooming luxuriantly in the dry and sterile looking granite sand. By those who have explored this grand canyon more fully than we could then do, I am informed that the water of Columbia lake empties into the Kaweah; while the stream in the deep gorge beyond feeds the Kern.

But now look far eastward beyond the sharp, isolated, hut-like peaks, of which Kaweah peak, three or four miles to northward of us, is the highest, and estimated by our State geologist as more than 14,000 ft. Stretching for miles in that direction, and north and south along the line of drainage of the Kern are the high table lands of that fine river and its many tributaries. This broad, elevated valley is densely and uniformly covered with part of that inexhaustible timber belt that stretches from the sources of the main Kern, on the western slopes of Mt. Williamson, for nearly 70 miles towards Kernville, which is about 55 miles very little east of south from Miner's peak. Due east of us, the main stream is only about 7 miles distant. In its vast forest, but little explored as yet, hunters can find all the deer and bear they want. The streams abound with the finest mountain trout, which camping parties of ladies and gentlemen catch by thousands every summer. The mountain sheep, or "big-head," frequents the higher cliffs. But, see the vast rocky range beyond! What have we there? Why, the very highest of our high Sierra in plain view. There are

Mts. Whitney, Tyndall and Williamson.

Yes, at last we are looking with certainty on those celebrated peaks: In straight lines—as all these distances are given—Mt. Whitney, with its altitude of 15,000 ft., is 16 miles slightly north of east from us. Tyndall, 14,386 ft., is about 7 miles, a little west of north from Whitney; and Williamson, 14,300 ft., with its sharp, minaret-like pinnacles, 1 or 2 miles farther north; that is, about 20 miles northeast of Miner's peak. When we first saw the great summit ridge from the crest of the range we were on, dark clouds were settling around these highest peaks, and a thunder storm raged for an hour or two, though our sky was clear; but it passed away before we descended.

The Form of Mount Whitney,

Thine seen from the west, is so peculiar, and its predominating height is so evident, that it is

easily identified and remembered. Its appearance is that of a half dome. From the base of a much lower dome, to southward—which forms the brow, while Whitney forms the huge Roman nose of an upturned face—there is a gradual curve to northward, where its highest point is. Its northern face appears precipitous, dropping off suddenly in three distinct, regular steps—with the symmetry of a design from some huge, rough-ashler. From the commanding point of Miner's peak any unbiased observer can clearly see that Mount Whitney, as here described, towers far above any neighboring peak, the only peaks approximating its altitude being the high, sharp peaks to northward, known among scientists as Tyndall and Williamson. It is quite probable that one of the last named peaks, or a neighboring one, is the so-called Fisherman's peak—if not Mt. Whitney itself—which several amateur mountain measurers have guessed was possibly higher than the grand peak which has come to be known as Mt. Whitney.

Mt. Brewer, 13,880 Ft.,

A long, narrow peak, shaped somewhat like a chisel, is about 16 miles almost due north from Miner's peak. Six miles north of it is Mt. Gardner (14,000 ft.), and four miles farther north is Mt. King (14,000 ft.). Mt. Silliman, distinctly seen from the Tulare and Fresno plains as a long saw-tooth peak (11,623 ft.), is only about 13 miles from Miner's peak. The ridge running southeast from Silliman, 10 miles to Mt. Kaweah, and thence in a curve northeast 17 miles to Mt. Williamson, forms a huge V, and is part of the boundary line between Tulare and Fresno counties. Beyond it, you are overlooking the various divides drained by King's river. Slightly west of north, 44 miles, is Mt. Goddard, 14,000 ft.—eastward 43 miles, westward 12—on the northern and eastern slopes of which the south fork of San Joaquin river has its sources. In the same direction and 90 miles distant is

Mt. Lyell, 13,217 Ft.,

On whose southeastern and western slopes the main San Joaquin and its north fork rise, while its northern glaciers feed the Merced. To Owen's lake, due east, is 27 miles; to Independence, northeast, is 30; to Mammoth City, 28 miles west of north, is 80 miles; and to San Francisco—northing 90 miles, westing 210—the distance, as the crow flies, is about 225 miles. To the nearest point on Tulare lake southwest is 55 miles; to the crest of the Coast Range mountains beyond it, 90 miles; and following in the same line to the

Nearest Points on the Pacific Ocean,

About 140 miles. These nearest points are Moro Rock in Estero bay, and San Luis Land, nearly 20 miles farther south, in San Luis bay. Slightly north of west, it is 180 miles to the nearest point on Monterey bay. To Santa Monica, due south, is 165 miles. Considering these last figures, coupled with the facts, first, that the top of Miner's peak is about 23 miles above sea-level; second, that many depressions in the intervening Coast Range, from 90 to 100 miles distant, are little more than 3,000 ft. in altitude; third, that from a height of 13,000 ft., the line of vision commands a radius of about 140 miles of the earth's surface; it seems barely possible, that, late on the afternoon of our clearest days, the glistening waves of the Pacific may be seen, if you look southwest from the top of Miner's peak, by their reflection of the rays of the departing sun, especially if the state of the atmosphere will aid by its mirage. Some mountain climbers of that region assert positively that they have seen such sparkling surface beyond the dark outlines of the Coast mountains.

Best Route to Mt. Whitney.

Though Mt. Whitney is but 18 miles in a direct line from the town of Mineral King, it cannot be reached in less distance than 50 miles, and by moderately good trails most of the distance. Ten days should be allowed for the entire trip there and back. You go southeast through Farewell gap, and down the Little Kern to the main river, up the west bank of the latter to a point above a lake covering some 90 acres, and called, as yet, Kern lake. There you cross the main Kern and follow up Whitney creek to our highest mountain. The latter creek you cross on a natural bridge just above its mouth. For most of the way you follow the Hockett trail, between Tule river and Lone Pine. This is the route of all routes from the west to Mt. Whitney and all its curious surroundings.

Hanford, Sept. 22d.

RETURNING PROSPECTORS.—During the past few days a number of prospectors have come into town from various sections after supplies and to exhibit specimens of what they found during the summer campaign. Mike Solney and J. Sullivan came from the vicinity of Mt. Grant in Esmeralda county yesterday. They have two good sized ledges over there which prospect well. The rock contains gold and silver and is in a porphyry formation. They report the country terribly rough but rich in mineral. Two prospectors arrived from the vicinity of Bloody canyon Tuesday forenoon. They have been out there for two months investigating the hills for many miles. They speak in very encouraging terms of the formation. The country is straight up and down, but is interesting and they predict a bright future for the place. A great many men are over there now, but owing to the poor conveniences but little headway is being made in developing claims. Next summer will witness a great change in the whole country around about Homer district. —Bodie Free Press.

Bisbee City, Arizona.

A correspondent of the *Arizona Citizen*, writing from Bisbee, says:

Tombstone has awakened to the stern reality that her eister neighbor may at no distant date be a formidable rival of no mean consideration. So deep an interest have the population of Arizona's brightest prospect taken in Bisbee City that a subscription for direct communication has met the hearty approval of all.

Improvements in the shape of building are retarded because of the difficulty of procuring lumber, and so the different classes of business are at present content to use canvas architecture for shelter. Lots are being graded and sold all down the canyon, even below the smelter, and should water be found by Messrs. Herring & Co., there can now be no doubt of a beautiful and profitable future for this mountain settlement.

The Queen is progressing in her powers of production with every blast. Each full day's work consumes nearly 15 tons of ore, making the round of three shifts (day and night) about 30 tons. Each charge consists of 300 lbs. of ore, 35 lbs. of silica and charcoal and coke to complete it. From the run of a full 24 hours, there is between 4 and 5 tons of ore which, in San Francisco, quotes at \$270. To-day, besides the shipment of 43,000 lbs. now on its way to the Eastern reduction works, there lies 120,000 lbs. on the metal "dump," awaiting teams to freight it to Benson. "Actions speak louder than words." The smelter, under the able management of its inventor, Mr. Lewis Williams, is perfect in the working of ores from the mine. The crucible bottom, made of a mixture of clay, quartz and coke, pulverized, seems too frail to withstand the intense chemical action of the copper upon its surface, and in consequence thereof requires constant attention and occasional replacement. Eventually, all these delays will be avoided, and then can be known the full power of production.

As yet, everything about the mine shows an unlimited quantity of high-grade ore. Opening at different points, it matters not where, always disclose the "welcome green," and at all times during the day visitors may be seen hunting "specimens," which are most generously given by the owners of the mine, Messrs. Martin and Ballard. At night it is a glorious sight to watch the flowing metal as it leaves the furnace spout and passes down the eleg-waste.

Treating Sulphurets.

In treating sulphurets, says the *Nevada Transcript*, it has been the custom for years to first crush the rock in the battery, after which it passes over the silvered coppers, when the free gold is caught, and the sulphurets and sand pass to the shaking tables, or what is still better, Frue concentrators, where the former is collected, and the latter allowed to pass off into the ravines and creeks. The sulphurets are then worked by chlorination. Where the quartz shows free gold instead of sulphurets, this plan of working ore will probably be continued. Where, however, the rock is heavily charged with sulphurets, it has been practically demonstrated that at least two-thirds of the gold, in the shape of infinitesimal particles of sulphurets, are floated off with the sand and water, and are lost. Assays of ore that went as high as \$200 and even \$300 per ton, have yielded not more than from \$30 to \$40 per ton by mill process.

At the Merrifield mine, on Deer creek, a large portion of the ore is heavily impregnated with sulphurets, and, notwithstanding the fact that the rock by fire assay showed its value to be hundreds of dollars per ton, yet after working the quartz in the most approved manner by the old process, including the use of Frue's concentrators, it was found that the average pay of the ore was about \$25 per ton including sulphurets. The owners believing there was a screw loose somewhere, determined to try a new plan. After the rock passed through the batteries and over the plates, it was caught in vate, nothing being allowed to pass off but the water, after which it was taken to the reduction works of the Pioneer Company, on Gold Flat, where it was chlorinated and worked the same as sulphurets. Nine tons of ore of the same quality as that which heretofore paid \$25 per ton, yielded over \$100 per ton—the aggregate amount being nearly \$1,000. They are now satisfied that nearly two-thirds of the gold in the rock was lost by its being carried off with the sediment and water in exceedingly small particles. No more rich sulphurets rock will be worked in the future at the above named mill by the old method. As the ore is brought to the surface it is put in a dump by itself, and will be worked by the chlorine process. Over \$12,000 a year will thus be added to the income of the owners of the Merrifield mine.

THE Copper Knob mining company, of North Carolina, paid a dividend of \$3,000 in New York on Sept. 23d. The capital stock is divided into 300,000 shares of the par value of \$1 each. This is the first dividend, and is probably the smallest one declared by any mining incorporation. It is just one cent per share. But stockholders in California as well as in New York are in a condition to appreciate dividends, no matter how small, provided they are regular and frequent.

MECHANICAL PROGRESS.

The Future of Steel.

J. S. Jeans, Secretary of the British Iron and Steel Institute, lately made the following remarks respecting the subject heading this article: "The more the subject of the manufacture and uses of steel is inquired into, the more does it seem incapable of exhaustion. Great things have been accomplished in the past, but much yet remains in the future. The manufacture of steel is far from finality. Even now some of the leading steel works in France are essaying the production of ingots of 100 tons weight. Steel, indeed, may be compared, in reference to its multifarious uses, with the elephant's trunk, the adaptability of which enables it with equal ease to pick up a needle or pull up a tree. High authorities have expressed the opinion that steel will have the future nearly altogether to itself, displacing copper for fire-boxes, etc., silver for articles of ornament, and lead for its specific purposes, as much as it is superseding iron in respect to utility, economy and endurance. And as it is difficult to set bounds to the ultimate application of steel, so it is impossible to limit the means of its production."

Recent metallurgical progress has indefinitely increased the resources available for the latter purpose. Science has at last found a method of ridding of their deleterious contents the ores of iron heretofore unsuited for the manufacture of steel, and henceforth, if metallurgists of experience are not greatly deceiving themselves, the cheapest and most plentiful area will, by one of the greatest chemical triumphs of the age, be raised to the same rank as the richer and comparatively limited area that have alone been deemed fit for steel manufacture until now. The horizon of the future, therefore, is not bounded by any limitation of the supplies of raw material. Nor is it any more likely to be measured by the uses of steel, for they are multiplying every day, and as the manufacture is cheapened and improved, so will the applications continue to increase. In the track of this movement many changes must follow, and have even already occurred, of which we have been able to take but scant cognizance. The hard and irksome work of the puddler has been superseded by less arduous, and, in the main, by less skilled labor. One of our greatest authorities has calculated to convert fluid cast iron into steel; the labor required is only about one-third of that needed to convert pig metal into wrought iron, while the fuel consumed is only about one-fourth of that formerly used. The economy of coal is, therefore, another important corollary of the advance of steel; and this economy, great though it be in the aggregate, is trifling in comparison with that accomplished through the greater strength and endurance of that which we are fully justified in describing as the metal of the future."

A New Projectile.

Gen. Hutchinson, an officer in the British army proposes, in the last number of *Macmillan's Magazine*, an entirely new form of projectile to meet the novel conditions of penetration necessitated by the monitor-type of war vessels. However modified in details of construction, the warship of the present conforms more and more to the monitor principle, in the submergence of the hull and its protection by means of armored sides sloping at an angle calculated to send projectiles glancing off harmlessly; and the indications are that the war ship of the future will always present a turtle back to the enemy's guns, rather than the high vertical sides of the old style of ships.

Against armor of this sort but little is gained by increasing the weight of projectiles and the range of guns. The cylindrical shot, spirally rotating, may be irresistible when fired against a vertical target; but they are hurled in vain against a ship with no sides to batter.

The projectile proposed by Gen. Hutchinson has a disk-like form and a vertical rotation. Instead of glancing from a flat-armored ship, or from water, such a shot must of necessity maintain its line of motion; and with heavy shot no slope however slight given to armored decks or bottoms could save them from penetration. With a rotation like that of an advancing carriage-wheel the upper edge of the projectile, on striking a ship's bottom, would receive an impulse upward and crash through any double bottom or cellular compartments. With the reverse rotation the lower edge would receive an impulse downward, and the whole momentum of the projectile would be brought to bear like a heavy circular saw upon the deck impinging upon.

The rotation is imparted to the projectile by a "catch" in the barrel of the gun which gives the projectile a twist as it leaves it. No rifling is required, and the entire surfaces of both bore and projectile are smooth with the exception of a slight protuberance—the "catch"—in the former and a corresponding depression in the latter. The projectile simply rolls out of the gun, with great initial velocity, unretarded by rifling or a column of packed air before it, as is the case with ordinary projectiles. A very simple illustration shows the manner in which both gun and projectile is formed and operated. The same projectile, whirling rapidly along the ground, would prove far more destructive to cavalry or infantry than any other projectiles now in use.

A New Mechanical Motion.

There are reports of the discovery and utilization of an entirely "new mechanical motion," by a company styled the New York and London Metal, Wood and Stone Working Company. The object of the device is to cheaply and expeditiously work wood, metal and stone. The agent is described as a perpendicular, reciprocating, rotary, or spiral motion, by which a pair of tools is made, each separately, to revolve horizontally or to raise and fall vertically. The tools, which are of various shapes, according to the material to be worked upon, are thus caused to strike peculiar cutting, turning, or winding blows. These blows, delivered with lightning-like rapidity at the rate of 6,000 to 10,000 per minute, produce certain new and useful results, heretofore unknown and impossible to be effected by any known machinery, and in certain important respects, impossible to be practically accomplished even by the most skilled hand labor. Many classes of useful and ornamental work, hitherto done with painful slowness, at great expense, by skillful workmen, can now be done with great rapidity, beauty and accuracy by apprentices and girls. The machine constructed by this company, while they all embody the same principle, are divided into three classes, each wholly different from the other in size, appearance and arrangement of auxiliary parts from the small metal machine, adapted to do the most delicate and beautiful work on gold, silver, and other metals, to the magnificent three-ton machine, the cutting-head of which moves with majestic and irresistible power across the face of large blocks of granite.

A Queer Locomotive.

The Patterson (N. J.) *Guardian* says that an engine is now in process of construction at the Grant Locomotive Works which, it is thought, will eclipse for speed anything yet built. It will look like an ordinary engine turned upside down. The machinery will be on top of the boiler instead of under it, as usual, and the boiler will hang very low on the wheels. There will be two pairs of driving-wheels, but instead of having them follow each other, one pair will be on top of the other. The rear driving-wheels will be the upper pair, and they will turn in the opposite direction from that in which the engine is going. They will rest upon the rims of the other pair, which will in turn rest on the track. The revolution of the upper pair, by friction, is expected to drive the lower pair, the tires of the latter serving as tracks for the upper ones. It is thought that a good deal greater speed can be got out of the machinery by this construction, and it is expected by the inventor that it will be the fastest locomotive ever made. Practical workmen, however, think it won't go at all. It will look very funny, as it is running through the country, with the upper pair of driving-wheels, five ft. in diameter, revolving up in the air in the wrong direction at a tremendous speed, and the eccentrics, rocking-bars, link-motion and pistons on the top of the boiler.

HOW TO WELD A BROKEN SPRING PLATE.—Get the length and then take the part of broken plate which is easiest to handle and upset it suitable for welding. Make a piece of iron five-eighths of an inch wide, quite thin at one edge, leaving the other about three-eighths of an inch thick, something like a razor blade. Take a welding heat on the part that has been upset and weld the iron across, having the thick end on the point of the plate. Scarf it for welding, upset the other part of plate and scarf it so that when welding, the piece of iron comes between the two steels. In the first heat—it can not be done in one—don't strike too hard at first, and thin down any thick edges of the scarfs. Take a second heat and the result will be, in the hands of an average smith a good sound weld. If the steel is at all fiery do not attempt to weld it. Should there be a hole near the broken place, showing, on being heated, any sign of a flaw, make a new plate. The piece of iron welded between, facilitates the welding, and also makes up for the length lost in jumping.—*London Coach Builder's Journal*.

THE ACTION OF PLUMBAGO.—Friction is the interlocking of the minute elevations and depressions on the bearing surfaces; graphite, which is impalpably fine, packs itself into the depressions of a bearing, raising them to an even surface, and as there are no depressions or elevations there is, as a result, the minimum of friction, which on first appearance seems truly magical. A planing table at the Stevens Institute, was lubricated with sperm oil, and it required then the united force of eight men to move it. When the same table was lubricated with graphite it was moved with ease by a single person, with one hand.

UTILIZING OLD STEEL.—An Englishman named Drake has invented a process of using up old steel in the formation of a new metal which is said to possess extraordinary strength and ductility. The process consists in mixing up old steel with a patent compound, and subjecting the whole to an intense furnace heat, when the particles amalgamate. Steel made on this plan has been sold for \$45 per ton. The process is said to be second in importance only to Bessemer's invention, and it will be especially valuable as finding use for old Bessemer steel rails.

SCIENTIFIC PROGRESS.

Transmitting Sound by Light—A Remarkable Discovery.

Mr. Bell, the well-known inventor of the telephone, has just announced, at the late meeting of the American Association of Science, at Boston, a new and still more remarkable discovery than that which has already made his name famous. His new discovery is nothing less than the production and reproduction of sound by the undulations of light. By the telephone, as is well known, sound is conveyed from one vibrating disk to another by means of a wire connecting the two; and the sound is made still more audible when the connecting wire is charged with a continuous current of electricity. By Mr. Bell's new instrument, which he calls a "photophone," sound is conveyed from one vibrating disk to another by such an unsubstantial thing as a simple ray of light, without any connecting wire whatever. To illustrate, take a telephonic circuit, and remove the connecting wire. Substitute, in place of the ordinary transmitting disk, a flexible mirror of thin mica or glass, in such a position that it may receive light directly from the sun, or from any other source, and have an intervening lens or lenses so placed that the light thus received may be reflected in a straight line to a receiving disk of selenium placed at the opposite termini of the circuit. Now, if the speaker's voice is directed against the back of the transmitting mirror, the mirror will vibrate the same as the transmitting disk of a telephone, and these vibrations produce corresponding undulations in the beam of light reflected by it.

Just here comes in the new discovery by Mr. Bell, that the undulations of the beam of light not only convey to the receiving disk the vibrations of the transmitting disk, but, through the peculiar properties of the selenium, these vibrations are made audible, the same as when connected by the wire of the ordinary telephone; in other words, the beams of light in the photophone take the place of the wire in the telephone.

It has been found that other substances than selenium, when in the form of thin diaphragms, are thus sensitive to the action of light; but none other so much so as to make it practical. Musical tones are more easily produced than any other. Even the light of a candle has been found sufficient for the purpose. Mr. Bell, in his address at the late meeting of the American Association of Science, said: "The fundamental idea, on which rests the possibility of producing speech by the action of light, is the conception of what may be termed as an undulatory beam of light, in contradistinction to a merely intermittent one." He defined an undulatory beam as one that shines continuously upon the selenium receiver, but the intensity of which was subjected to rapid changes, by the constantly varying surface of the transmitting mirror. Thus far the experiments have been conducted over short distances only; but there is every reason to believe that similar results may be obtained as far as a beam of light can be conducted. Speculations in regard to the practical value of this discovery would now be premature; but the whole world waits with impatient curiosity for further developments.

AN ASTRONOMICAL DISCOVERY.—Prof. E. C. Pickering, director of the Harvard observatory, lately made a discovery which is regarded as one of the most important of the century in stellar physics. In the ordinary telescope a star appears as a point of light, brighter, but not larger than when looked at with the naked eye. Prof. Pickering finds that, on placing a prism between the object glass and the eyepiece of his telescope, the light of a star is drawn out into a continuous band. When, however, the telescope with the prism is directed to a planetary nebula, the light is collected into a star-like point without any band, enabling the astronomer to distinguish instantly between a star and a planetary nebula. This principle has already enabled Prof. Pickering to discover several planetary nebulae. On Thursday evening, August 26th, an object was observed which presented the appearance of two star-like points within the band in the modified telescope. It is different from anything heretofore observed in the telescope, and is regarded as an important object for investigation.—*Scientific American*.

NEW USE FOR THE SAND BLAST.—A new use for the sand blast has been found. This is for sharpening old files. The experiment has been successfully tested in railroad machine shops in New England. The apparatus consists of a steam pipe leading from a boiler, and a small hose connecting this pipe with a box filled with fine wet foundry sand. When steam is passed into the pipe the sand is drawn into it and propelled with great force against the object to be cut. The file is held in the blast with the tang towards the operator, and is perfectly and easily sharpened in from two to five minutes, leaving the file in better shape than when recut. Razors and edge tools can be sharpened in the same way.

A New Way of Studying Sounds.

A new and simple way of producing colored rings, which seems capable of some interesting applications, has been recently brought to public notice by M. Guebard. A saucer filled with not very pure mercury is all the apparatus required. Then clear off with a piece of card or paper, the thin pellicles of oxides and dust, breathe on this bright surface, and a magnificent system of colored rings is given by the film of condensed moisture formed thereon. Instead of the four or five "irises" described by Newton, six or seven can be well made out, and the thickness of the film increasing from the border inwards, the order of hues is reversed.

Still hotter effects can be had by dropping volatile substances (as petroleum oil) on the mercury surface, instead of breathing on it; but the most remarkable results are had with condensation. Diluted with ether, this gives pellicles on the mercury, which may be detached (after their thickness and colors have been regulated at will) and transferred to paper. M. Guebard has utilized these effects in the study of the sounds of the voice. Vowel sounds uttered above the moistened mercury surface produce characteristic ring figures, which throw new light on the nature of the vibrations involved. The vibratory state, indeed, for vowel sounds, appears to be often very complex, the figures presenting groups of several ring systems indicating several centers of percussion.

INFLUENCE OF LIGHT ON SIZE OF LEAVES.—M. Ch. Flahault, in the *Annales des Sciences*, brings forward additional observations to support his view that under equal conditions the leaves of plants of the same species are larger in proportion as we go northward, those relatively higher dimensions being due to the duration of light of relatively feeble intensity. In cases where the chlorophyll is formed in the absence of light, it must be formed at the expense of the materials stored up in the tissues. The importance of these reservoirs of nutriment is still greater in the case of flowers. Thus, of hyacinths, both red and blue, M. Flahault found no difference in the color of the flowers grown in the light or in the dark, the color being manufactured from the stores of material in the bulbs.

A PECULIAR OCCURRENCE OF DIAMONDS.—Fouque and Levy note in the *Comptes Rendus* of the French Academy of Sciences a peculiar occurrence of diamonds between Kimberley and Waal, in South Africa, are rocks resembling serpentine and some opals, which are looked upon as the products of metamorphism of younger dolerites and other rocks of the diorite group, similar to those found in the Pyrenees. In thin sections of these opals minute diamonds have been found. They were recognized as such by their power of refractory light and by their hardness.

NEW PLANETARY THEORY.—In recent papers before the French Academy, MM. Gaussin, Faye, Chase and Scobol have discussed various indications of law in the arrangement of the planets and some of their bearings upon the nebular hypotheses of Laplace and Herschel. The indications which were given by Prof. Chase were the closest and most striking, furnishing numerical evidence of a projectile force connecting the solar system with the fixed stars.—*Comptes Rendus*.

AN ELECTRIC SUN.—Lontin has been exhibiting in the building of the Industrial Exhibition in the Champs Elysees, Paris, a circular electric light, formed by four voltaic arches. He uses four carbons placed radially, the two which are in the same diameter being connected with the same pole, so that an arch extends from each of the carbons to each of its neighbors. These four arches unite to form a complete circle and produce a light of extraordinary brilliancy.

PHOSPHORESCENT LIGHTING.—Dr. Phipson takes sulphide of barium, or some other substance which is rendered phosphorescent by the solar rays, and encloses it in a Geissler tube, through which he passes a constant electric current of a feeble but regular intensity. He claims to obtain in this manner a uniform and agreeable light, at a cost lower than that of gas.—*Les Mondes*.

A DELICATE CALIPER.—The pachymeter, lately patented in Vienna, which determines the thickness of paper to the one-thousandth part of an inch, is outdone by the micrometer caliper, now coming into use in this country, which determines the thickness of paper or anything else to the ten-thousandth part of an inch.

LUNAR GEOLOGY.—J. Landerer has submitted to the Paris Academy a work in which he seeks to determine the lithologic character of our satellite. He thinks that the density of the moon, and the angle under which it polarizes the light of the sun, are such as to show that the materials of the surface are analogous to those of the silicate rocks.

COPPER IN PLANTS.—M. Dieulafoy reports the presence of copper in plants which grow on rocks belong to the older geological formations. He says that plants growing in soil formed by the decomposition of primitive rocks contain such quantities of copper that it is possible to detect the copper in one grain of their ash by means of ammonia.

Table of Highest and Lowest Sales in
S. F. Stock Exchange.

Name of Company.	Week Ending Sept. 9.	Week Ending Sept. 16.	Week Ending Sept. 23.	Week Ending Sept. 30.
Albion	67 61	61 53	53 51	51 50
Alta	3.10 2.40	3.05 2.10	3.20 2.10	3.10 2.10
Andes	1.90 1.60	1.90 1.70	1.70 1.50	1.70 1.50
Alps	45c	50c	40c	35c
Argenta	2.45	2.15	2.35	1.95
Atlantic	1.11	1.15	1.01	1.01
Aurora Tunnel	1.60	1.45	1.15	1.20
Baltimore Con.	75c	60c	80c	1.20
Belcher	1.70	60c	60c	50c
Belmont	1.50	1.11	1.20	1.35
Best & Belcher	1.60	1.11	1.20	1.35
Bullion	1.70	1.60	1.50	1.40
Rechtel	1.50	1.11	1.20	1.35
Belle Isle	1.70	1.60	1.50	1.40
Bodie	1.50	1.11	1.20	1.35
Benton	1.70	1.60	1.50	1.40
Bulwer	2.45	2.15	2.35	1.95
Boyle	30c	25c	35c	25c
Black Hawk	1.11	1.15	1.01	1.01
Belvidere	1.10	1.15	1.01	1.01
Booker	1.10	1.15	1.01	1.01
California	2.10	2.05	2.55	2.35
Challenge	1.50	1.11	1.20	1.35
Confidence	1.50	1.11	1.20	1.35
Con Imperial	1.50	1.11	1.20	1.35
Con Virginia	1.50	1.11	1.20	1.35
Crown Point	1.50	1.11	1.20	1.35
Con Washoe	1.50	1.11	1.20	1.35
Champion	1.50	1.11	1.20	1.35
Concordia	1.50	1.11	1.20	1.35
Dayton	1.50	1.11	1.20	1.35
DeFrees	1.50	1.11	1.20	1.35
Day	1.50	1.11	1.20	1.35
Eureka Con.	1.50	1.11	1.20	1.35
Exchequer	1.50	1.11	1.20	1.35
Endowment	1.50	1.11	1.20	1.35
Gen Thomas	1.50	1.11	1.20	1.35
Grand Prize	1.50	1.11	1.20	1.35
Gila	1.50	1.11	1.20	1.35
Golden Chariot	1.50	1.11	1.20	1.35
Golden Terra	1.50	1.11	1.20	1.35
Goodshaw	1.50	1.11	1.20	1.35
Gould & Curry	1.50	1.11	1.20	1.35
Hale & Norcross	1.50	1.11	1.20	1.35
Hillside	1.50	1.11	1.20	1.35
Higbridge	1.50	1.11	1.20	1.35
Homestake	1.50	1.11	1.20	1.35
Hussey	1.50	1.11	1.20	1.35
Independence	1.50	1.11	1.20	1.35
Julia	1.50	1.11	1.20	1.35
Justice	1.50	1.11	1.20	1.35
Jackson	1.50	1.11	1.20	1.35
Joe Scates	1.50	1.11	1.20	1.35
K K Con.	1.50	1.11	1.20	1.35
Kanuck	1.50	1.11	1.20	1.35
Kesuth	1.50	1.11	1.20	1.35
Keystone	1.50	1.11	1.20	1.35
Lady Bryan	1.50	1.11	1.20	1.35
Lady Wash	1.50	1.11	1.20	1.35
Leopard	1.50	1.11	1.20	1.35
Leviathan	1.50	1.11	1.20	1.35
Leds	1.50	1.11	1.20	1.35
Les	1.50	1.11	1.20	1.35
May Belle	1.50	1.11	1.20	1.35
Modoc	1.50	1.11	1.20	1.35
Manhattan	1.50	1.11	1.20	1.35
Martin White	1.50	1.11	1.20	1.35
McClintock	1.50	1.11	1.20	1.35
Meadow Valley	1.50	1.11	1.20	1.35
Mexican	1.50	1.11	1.20	1.35
Mides	1.50	1.11	1.20	1.35
Morning Star	1.50	1.11	1.20	1.35
North Con Virginia	1.50	1.11	1.20	1.35
New York	1.50	1.11	1.20	1.35
Northern Belle	1.50	1.11	1.20	1.35
Norcos	1.50	1.11	1.20	1.35
Navajo	1.50	1.11	1.20	1.35
Ophir	1.50	1.11	1.20	1.35
Oriental	1.50	1.11	1.20	1.35
Overman	1.50	1.11	1.20	1.35
Phenix	1.50	1.11	1.20	1.35
Phil Sheridan	1.50	1.11	1.20	1.35
Potosi	1.50	1.11	1.20	1.35
Prospect	1.50	1.11	1.20	1.35
Raymond & El	1.50	1.11	1.20	1.35
Richer	1.50	1.11	1.20	1.35
Rock Island	1.50	1.11	1.20	1.35
Rye Patch	1.50	1.11	1.20	1.35
Rough & Ready	1.50	1.11	1.20	1.35
Savage	1.50	1.11	1.20	1.35
Seg Belcher	1.50	1.11	1.20	1.35
Sierra Nevada	1.50	1.11	1.20	1.35
Silver Hill	1.50	1.11	1.20	1.35
Sierra Nevada	1.50	1.11	1.20	1.35
Silver Prize	1.50	1.11	1.20	1.35
Succor	1.50	1.11	1.20	1.35
Summit	1.50	1.11	1.20	1.35
Scorpion	1.50	1.11	1.20	1.35
Solid Silver	1.50	1.11	1.20	1.35
South Bodie	1.50	1.11	1.20	1.35
South Standard	1.50	1.11	1.20	1.35
Star	1.50	1.11	1.20	1.35
St. Elia	1.50	1.11	1.20	1.35
Syndicate	1.50	1.11	1.20	1.35
Tioga Con	1.50	1.11	1.20	1.35
Tiptop	1.50	1.11	1.20	1.35
Trojan	1.50	1.11	1.20	1.35
Union Con	1.50	1.11	1.20	1.35
Utah	1.50	1.11	1.20	1.35
Vermont Con.	1.50	1.11	1.20	1.35
Ward	1.50	1.11	1.20	1.35
Wells Fargo	1.50	1.11	1.20	1.35
Woodville	1.50	1.11	1.20	1.35
White Cloud	1.50	1.11	1.20	1.35
Yellow Jacket	1.50	1.11	1.20	1.35

Sales at S. F. Stock Exchange.

Thursday A.M. Sept. 30.		700	Argenta	40@35c
80 Alta	2.35	120	Alta	1.85
20 Alpha	1.30	130	Alpha	1.30
350 Andes	1.75	130	Andes	1.75
50 B & Belcher	1.10	10	Bodie	1.30
1050 Bullion	3.10@3.15	700	Belcher	1.60@1.65
123 Confidence	1.95@2.00	150	Black Hawk	1.50
100 Con Virginia	2.10	100	Bulwer	1.30
100 Con Imperial	2.10	100	Belvidere	1.50
20 California	2.10	100	Champion	2.00
320 O Dorado	2.10	250	Columbia	1.30
330 Crown Point	1.90@1.85	100	Day	1.30
85 Exchequer	2@1.95	100	Day	1.30
60 Golden Gate	2.10	100	Day	1.30
280 Gould & Curry	2.10@2.15	100	Day	1.30
30 Hale & Nor	2.10	100	Day	1.30
1150 Julia	2.10	100	Day	1.30
200 Justice	2.10@2.05	100	Day	1.30
30 Kanuck	1.95	100	Day	1.30
100 Mackay	1.00	100	Day	1.30
205 New York	1.50	100	Day	1.30
115 Ophir	2.10@2.05	100	Day	1.30
100 Overman	1.10	100	Day	1.30
100 Occidental	1.10	100	Day	1.30
90 Potosi	2.10	100	Day	1.30
50 Silver Hill	1.40	100	Day	1.30
275 Scorpion	1.90	100	Day	1.30
350 Savage	2.25	100	Day	1.30
215 Sierra Nevada	1.10	100	Day	1.30
20 Utah	1.00	100	Day	1.30
135 Union	2.00@2.05	100	Day	1.30
100 Yellow Jacket	2.25@2.30	100	Day	1.30
100 Arizona	2.10	100	Day	1.30
575 Albion	3.00@3.50	100	Day	1.30

The first annual fair ever held in the Black Hills closed last Saturday at Deadwood after a week's very successful run. The exhibits were large and varied, and the prizes were liberal.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	18	50	Aug 2	Sept 29	Oct 18	W H Watson	302 Montgomery st
Belcher S M Co	Nevada	21	75	Aug 25	Sept 27	Oct 20	Jno Crockett	327 Pine st
Belvidere S M Co	California	8	40	Sept 15	Sept 15	Oct 15	C V Hubbard	310 Pine st
Booker Con M Co	California	6	25	Aug 1	Sept 17	Oct 7	W H Lent	309 Montgomery st
Bullion M Co	Nevada	16	100	Aug 16	Oct 4	Oct 28	J W Brazell	328 Montgomery st
Caledonia S M Co	Nevada	32	25	Sept 14	Oct 20	Nov 10	R Wegener	414 California st
Day S M Co	Nevada	7	15	Sept 22	Oct 25	Nov 22	J W Faw	310 Pine st
Bulley S M Co	Cal	10	25	Sept 25	Oct 18	Nov 10	E C Mastur	309 Montgomery st
Godfrey Gravel M Co	California	5	05	Sept 4	Oct 11	Oct 30	J M Budington	309 California st
Julia Con M Co	Nevada	13	40	Aug 30	Oct 4	Oct 25	H A Charles	419 California st
Justice M Co	California	10	40	Aug 27	Sept 29	Oct 22	E C Maskin	309 Montgomery st
Martin White M Co	Nevada	7	50	Sept 4	Oct 18	Nov 3	R F Kelly	419 California st
Maryland Con G & S M Co	California	2	25	Sept 10	Sept 15	Oct 4	J P Scoville	300 Montgomery st
Maybelle Con M Co	California	5	10	Aug 7	Sept 14	Oct 7	E P Fainsworth	202 Sansome st
Northern Belle M Co	Nevada	4	25	Sept 1	Oct 7	Oct 7	Wm J Taylor	310 Pine st
Ophir S M Co	Nevada	37	100	Aug 26	Oct 2	Oct 5	C L McCoy	309 Montgomery st
Overman S M Co	Nevada	47	50	Sept 7	Oct 13	Nov 3	G D Edwards	414 California st
Prospect G & S M Co	Nevada	7	10	Aug 21	Sept 23	Oct 16	H P Bush	431 California st
Queen Bee M Co	California	7	10	Aug 3	Sept 14	Oct 5	G W Fisher	309 Montgomery st
Quinn M Co	Nevada	2	25	Aug 20	Sept 13	Oct 13	W V Stetson	309 Montgomery st
Real del Monte M Co	Nevada	12	25	Sept 7	Oct 8	Nov 1	C V Hubbard	310 Pine st
Red Cloud Con M Co	California	8	25	Aug 17	Sept 23	Oct 18	Wm J Taylor	310 Pine st
Silver Hill M Co	Nevada	12	30	Sept 17	Oct 21	Nov 11	W E Dean	309 Montgomery st
Sierra Nevada S M Co	Nevada	63	25	Sept 1	Oct 16	Nov 16	L Parker	309 Montgomery st
Summit G M Co	Cal	6	25	Aug 23	Sept 11	Oct 21	W H Lent	309 Montgomery st
Telfair M Co	Arizona	4	02	Aug 20	Oct 2	Oct 23	J Pentecost	702 Market st
Tioga Con M Co	Cal	11	15	Sept 17	Oct 22	Nov 11	W H Lent	309 Montgomery st
Mexican G & S M Co	Nevada	13	100	Sept 3	Oct 23	Nov 17	C L McCoy	309 Montgomery st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Amador Canal & M Co	California	3	100	Aug 13	Sept 21	Nov 2	R N Van Brunt	318 Pine st
Bismarck M Co	Nevada	2	02	Aug 17	Sept 20	Oct 11	A K Durbrow	309 Montgomery st
Butte Creek Hydraulic M Co	California	6	15	Sept 12	Oct 27	Nov 16	R L Taylor	309 Montgomery st
Eintracht Gravel M Co	California	5	100	Aug 24	Oct 1	Oct 16	H Kuntz	209 Sansome st
Equator M Co	Nevada	3	25	Sept 2	Oct 7	Oct 23	Wm Willis	404 Montgomery st
Gopher Con M Co	Dakota	1	100	Aug 11	Sept 12	Oct 12	The Widman	404 Montgomery st
Hazard Gravel M Co	Cal	5	7	Sept 27	Oct 27	Nov 15	J T McGeehan	316 Pine st
Headlight M Co	California	3	10	Aug 17	Sept 20	Oct 12	A W Rose, Jr	302 Montgomery st
Mayflower Gravel M Co	California	3	10	Aug 26	Sept 30	Oct 19	J Morris	328 Montgomery st
McElroy G M Co	California	8	05	Sept 2	Oct 5	Oct 25	Lewis Rubio	607 Washington st
Pepper D. Smith Con G M Co	Cal	5	05	Sept 23	Oct 1	Oct 1	W H Lent	309 Montgomery st
San Francisco Copper M Co	Cal	6	50	Sept 15	Oct 15	Nov 15	R H Pond	238 Market st
Silveropolis G & S M Co	Cal	1	02	Aug 12	Oct 1	Nov 1	John E Mason	306 Pine st
Utah S M Co	Nevada	31	20	Aug 11	Sept 13	Oct 1	G O Pratt	309 Montgomery st
Yellow Jacket Con G M Co	California	1	20	Sept 1	Oct 2	Oct 23	A Feist	309 California st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Gipsy Queen M Co	Cal	E Edwards	330 Pine st	Annual	Oct 7
Golden Gate Con M Co	Cal	J T McGeehan	318 Pine st	Annual	Oct 4
Mayflower M Co	Cal	J Moritz	328 Montgomery st	Annual	Oct 4
Niagara M Co	Nevada	O C Miller	324 Pine st	Annual	Oct 13
Oro M Co	Nevada	W Stuart	320 Sansome st	Annual	Oct 11
Red Cloud Con M Co	Nevada	W J Taylor	310 Pine st	Annual	Oct 13
Spaulding & S M Co	Cal	John Hein	117 Battery st	Annual	Oct 12
Tybo Con M Co	Nevada	W W Parrish	330 Pine st	Annual	Oct 6

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Consolidated Virginia M C	Nevada	A W Havens	309 Montgomery st	50	Aug 1
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Sept 1
Father De Smet Con M Co	Black Hills	Theo Widmann	404 Montgomery st	50	June 3
Grand Prize M Co	Nevada	E M Hall	327 Pine s	26	Sept 8
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	20	Sept 1
New York Hill M Co	California	J B Leighton	327 Clay st	50	Sept 1
North Belle M & M Co	Nevada	E M Hall	327 Pine st	15	Aug 2
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	Sept 8
Western M Co	California	C S Curtiss	309 Montgomery st	75	Sept 8

as these facts had been demonstrated, Sept. Jones wrote a full statement of them to Messrs. Watson, La Grange & Gibson, the New York bankers, who are heartily interested in the property, and ask for instructions as to the future course to be followed. They immediately telegraphed J. M. Taylor, the expert who represents them, and who was then looking after some of their Arizona interests, to hasten here and make a careful examination as to the prospects. Mr. Taylor arrived in this city last week, and spent some time in the mine. He went to San Francisco next, saying at the time of departure that he would send full instructions as to what should be done. Sunday evening Sept. Jones received from him a telegram dated at Colfax, saying to suspend all operations at the mine. He is now on his way to New York, where he will call a meeting of stockholders and lay the matter before them. It will then be decided as to whether or no another hundred feet will be sunk.

PLUMAS.

MINING ITEMS.—*Plumas National*, Sept. 25: Lots of mining men coming to Plumas. They are commencing to get on the right track. Thirty tons of rock from the Franklin mine, in Contra Costa, in White Sulphur Springs, yielded 477 per ton. This is exclusive of the sulphur, which are being saved. The Franklin is the mine recently purchased by the Suanville company from the Frenchman, Louis Loe. Another big ditch and gravel mine operation started up lately in the neighborhood of Mohawk. A ditch of 20 miles in length is one of the features, but that is a small matter in the day of gigantic mining enterprises. Parties from San Francisco are looking for some of the big gravel locations in the Clement. The probabilities are strong that a gigantic sale of mining property in this vicinity will be made in a short time, to an Eastern company. It covers some of the best gravel mines in Plumas, and will be a big bonanza for the new owners. Loring & Leavitt's claim in Elzebethown still continues to yield liberally. Surveyors are making a map of the Plumas Water Co.'s property. Flann & Hickman are pulling the Clement tunnel along at the rate of 3 or 4 ft per day. A Huntington quartz mill has been ordered for the Antelope mine in Long valley, on the Reno road.

CHEROKEE.—*Greenville Cor. National*: The Cherokee Co. have re-located and rebuilt the old Kettle mill. The machinery is all modern. It was formerly a small mill, but they have added 4 stamps. As soon as it is completed the company will mill rock from the Kettle and Bellas mines. They have also built a large boarding house and several miners' cabins. A fine chimney of rich rock has been developed in the old Kettle mine, and they will soon start a new shaft, which will go down with the pitch of the ledge. The property looks well, and will soon be a bonanza. The surveyors are booming along as usual at the Green Mountain. They are now working tunnel No. 5, and the ledge ranges from 10 to 14 ft wide, with 100 ft of backs to No. 4 tunnel, and from No. 4 to the surface is 340 ft, making 740 ft of backs from No. 5 to the surface. They are raising an air shaft from No. 5 to No. 4, the raising being up 200 ft now, and a shaft being sunk from No. 4 to the contact with the ledge. The Silver mine, however, has changed hands, and the ground for a new 40-stamp mill broken to-day. The new company intend to have the mill running by the time snow comes.

SAN BERNARDINO.

QUARTZ.—*Riverside Press*, Sept. 24: A. J. Myers and Antonio Atonelo are the owners of a gold claim, at Placerville, 22 miles southeast of Riverside, which promises well. At this surface the ledge is but 6 inches in thickness, but down at a depth of 22 ft the ledge has a width of 2 ft and 3 inches, and the rock grows richer as the shaft goes down. At the present time the rock contains much free gold. The first 4 days of last week 3 men took out and worked in an arastra 2 tons of rock, which yielded \$70, and, during Friday and Saturday, 700 lbs of rock yielded \$47.75.

SIERRA.

A PROSPECT.—*Mountain Messenger*, Sept. 25: The Bradbury boys and others, of Forest City, have struck a prospect in their shaft above Cornish ranch, on the north side of the Meadows, where we can learn that the shaft is about 50 ft and found the bedrock pitching into the hill.

DITCH TUNNEL.—The American Hill Hydraulic M. Co. are at work running a tunnel for a ditch, being afraid to trust the present tunnel for another season. The new tunnel will be about 800 ft long, half of which is already completed.

RECONSTRUCTION.—J. H. Thomas, Mr. Swan, Prof. Black and J. Stewart were examining the gravel leads at Morrilton, Grass Flat and La Porte, the past week, and appeared favorably impressed with those mining localities. This far no sale has been made, but one may be negotiated at any hour.

NEVADA.

WASHOE DISTRICT.

UTAH.—*Gold Hill News*, Sept. 20: The incline has been sunk a total distance of 20 ft below the 2150 level, and in hard rock. The east drift on the 1950 level is 320 ft in length, and has its face in softer vein matter. The drift will be continued, unless too heavy a flow of water is encountered, until it explores the formation in that direction to where any change in the formation is found.

COPPER CO.—Cutting down the connection south of mine No. 1, on the 2500 level, to create a gangway through to the Ophir shaft, so that the debris of the mine can be run to that shaft and relieve the Union shaft, that work on the south compartment may be expedited. This morning the face of crescent No. 1 is in better quartz and gives promise of ore.

THE OPHIR.—The drift toward the C. & C. shaft, on the 2500 level, is making excellent progress, and the north-east drift on that level will, during the week, connect with the Joint Mexican east crescent and give needed ventilation.

SIERRA NEVADA.—The incline raise from the 2300 level progresses as usual; total length, 130 ft. The east raise is up 35 ft and is without particular change. The formation has been the same as before.

C. N. S. SHAFT.—Running the pumps regularly and getting a fresh supply of water from the Hale & Norcross. The station on the 2400 level for the new hydraulic pumps is nearly completed, 60 of the 65 ft in length having been made. This station is 20 ft wide and 10 ft high. The foundations on the surface will be completed this week.

ALTA.—Crescent No. 1, 2500 level, is in 40 ft, and crescent No. 2 is in 54 ft. These crescents will be continued as far as possible without danger of flooding the mine, and when indications of water are seen the diamond drill will be used.

OVERMAN.—The winze from the 1900 level has attained a depth of 174 ft, and no increase of water has been struck. The formation continues hard, and contains large quantities of pyrites.

COS. VIRGINIA.—The Joint Best & Belcher winze is making rapid progress below the 2000 level. The yield of the mine remains unchanged.

CALIFORNIA.—The north drift on the 2300 level, to connect with Ophir and complete the thoroughfare between the C. & C. and Union shafts, is averaging 3 ft per day. The yield of the mine remains unchanged.

SILVER HILL.—Some good ore in streaks has been encountered in the south crescent on the 1300 level. The north drift on this level is making 5 ft per day.

LEVATHAN.—A station will be opened at the 850 level, and a crescent run through the ledge to the east wall.

HALE & NORCROSS.—The drift on the 2400 level has been started for driving that tunnel, and preparations are making for following up the hole by the crescent.

BESTON COS.—Work in the north drift, 1850 level, has been stopped and the men put to work on the 2050 level.

BRISTOL DISTRICT.

MILWAUKEE.—*Ploche Record*, Sept. 25: Arrangements have been made by John B. McGee with the New York stockholders of the Hillside company whereby the indebtedness of that company will be liquidated and the corporation placed upon a sound financial footing. This will be glad news to all. The Hillside is now looking well, and Manager Howell is pushing developments ahead with vigor. On the 6th level east, nearly 500 ft from the incline, they are drifting through a large ledge of spar and iron, carrying from 2 to 3 ft of good ore on the footwall. Still standing on the 3d and 4th levels west, and taking out some fine-looking ore. The furnace, upon the arrival of the new front, started up last Wednesday, with an abundance of coal and ore.

BRISTOL.—The Bristol company is sinking a new well, and after 200 ft in depth is attained, will apply the artesian well apparatus and put it down to the depth of 700 ft. They are now working 3 shifts, making 4 ft a day. During the week the Bristol company shipped, through Wells, Fargo & Co., 2 bars of fine bullion. One bar was worth \$2,169.05, the other \$1,614.89. This is the first shipment of the kind.

TEQUEST.—The Tequest, on the southwest line of the Hillside, is showing up a large body of yellow carbonate, with assays running as high as \$375 and \$362 per ton.

COLUMBUS DISTRICT.

SOUTH PLUMAS.—*Esmeralda Herald*, Sept. 25: This mine owned by S. C. Barnes and Peter Gaffney, and joining the Mt. Diablo mine to the south, bids fair to become as rich and famous as its world-renowned neighbor. A shaft has been sunk 14 ft, at which depth a ledge has been struck 8 ft in width, showing pure horn silver in goodly quantity. The discovery is an important one.

ESMERALDA DISTRICT.

GRAND TRUNK.—*Esmeralda Herald*, Sept. 25: The tunnel has been extended south into Middle hill, cutting 3 veins of high-grade ore. A crosscut was run from the end of the tunnel east 260 ft, passing through a fissure over 150 ft in width, showing a large quantity of low-grade ore. A winze is now being sunk on one of the rich ledges near the mouth of the tunnel, and is down 40 ft. The ledge at this depth is 13 ft in width, 13 inches of which on the main shaft is visible, and will yield up in the hundreds of dollars. This streak of high-grade ore increases in width as they go down.

REAL DEL MONTE.—A well-marked line of separation was in the shaft on the 15th, dipping to the southeast, which showed considerable favorable-looking quartz, and from which was a slight increase of water. The depth attained in the shaft last night was 790 ft. At the 800 level a station will be put. From this point operations will begin, and the country explored in all directions.

MILL TO START.—W. H. Bull has been at work for the past 2 weeks repairing the little quartz mill, and informs us that everything will be in readiness and the mill will be started next Monday or Tuesday. There are several lots of 2 to 10 tons of first-class ore to be run through and a large quantity of second-class ore to be worked. Bull & Groh have 10 tons that will mill not less than \$500 per ton. Lots that will average \$30, of which there is a great amount, cannot be worked in this mill, and will be thrown aside until a first-class mill is put up.

PIOCHE DISTRICT.

BULLIONVILLE MINE.—*Ploche Record*, Sept. 23: Work is still continued vigorously on this mine. The sinking of the main shaft being the principal work, which has been sunk to a depth of 50 ft, with stringers of ore coming in as work progresses. The work of sinking is getting easier, owing to the character of ore changing, and the owners of this mine are confident that they have a bonanza in the near future.

ARIZONA.

MINERAL CREEK.—*Chronicle*, Sept. 19: Mr. S. R. Sands, from Mineral Creek, came in last week and reports mining affairs as flourishing in that district. He is engaged in sinking on the Transfer and No. 1, two claims about 4 miles north from Hoyt's camp, where ledge veins were located by Mr. Sands in 1877, and give every indication of permanency and richness. Sufficient work has not been done on the claims to establish their extent, but the owner feels confident of their merit. Width of ledge is 4 ft, and the ore carries equal proportions of gold and silver. Prospectors are plentiful in that vicinity.

MINERAL CREEK MINE.—As this district is attractive to investors, the present information concerning the operations of the Mineral Creek M. Co. I thought it ought of place to give you some information concerning the district. The Mineral Creek M. Co. is employing some 40 men at the mill and mine. The grades and roads are all completed and the construction of the mill commenced. They expect to have the mill ready for receiving ore in 40 days. The ore taken from the ledge in all openings gives assays that are quite pleasing to the officers of the company. There are many other claims now opening in the district that promise to develop into valuable mines.

FRIA VIEW.—*Miner*, Sept. 25: W. M. Haugah, of Bel Rock or Big Bug, called on us to-day, stating that he had purchased the Fair View mine, and was having the same thoroughly prospected. From a quantity of fourth-class ore treated at the Fria furnace, a satisfactory result was obtained. The ore seems to be worth all the way from \$200 to \$750 per ton.

ALBERT LEE.—*Silver Belt*, Sept. 18: The Albert Lee is located on a bold ledge, which shows at intervals for 8 locations, or 12,000 ft. There are several prospect holes on the property, all of which show ore, and at some of them are quite respectable dumps. There is a shaft down 36 ft, and the ore is quite rich. The shaft only the hanging out shows. The country rock is quartzized. There are about 70 tons of ore on the dump. The gentlemen who own this mine, Messrs Lee & Brecken, intend to dispose of the property they own in the southern part of the Territory and use the proceeds in the developments of this mine.

COLORADO.

GOLD.—*Register-Courier*, Sept. 24: Messrs. Harrington & Moller shipped \$90,390 to-day in miscellaneous lots of gold bullion. This banking firm are purchasing large quantities of gold, for the most part in miscellaneous lots.

NEW STAMP MILL.—The Hidden Treasure M. Co. is about letting a contract for the construction of a stone mill building below their present 20-stamp mill on North Creek creek, and its dimensions will be 90x104 ft. The new site selected will give them at least 40 ft fall. It is the intention to put in a turbine wheel of a capacity of 75 stamps, 50 of which will be placed in position this fall.

SPLENDID MILL RETURN.—Mention was made some days ago that Messrs. Richards, Steele & Co. had struck pay in the lower shaft of the Jones mine, Nevada district. This was the ore of E. Randolph, this mine, Nevada district, which yielded 24 ounces and 13 pennyweights of gold for the lot of ore treated, equaling nearly 9 ounces gold per cord.

FURTHER DEVELOPMENT.—It is rumored on the streets of Central to-day that the Lacrosse M. Co. have let a contract for driving that tunnel, and preparations are making for following up the hole by the crescent.

SILVER MOUNTAIN.—On the Fanny lode, contractors have just completed sinking a lift of 80 ft in the bottom of the incline, giving a greater depth of 190 ft. Levels both ways have been started from the bottom of the main shaft. The crevice material at this point carries considerable ore, but in scattered quantities. The Cyclops is improving all along the line of the vein being worked.

IDAHO TUNNEL STRIKE.—*Courier*, Sept. 24: In our last we noticed a strike that had been made at the breast of the Idaho tunnel, of a fine body of ore. Mr. G. M. Henty visited the tunnel last Monday, and from the fact that the ore vein is about 6 inches thick and solid, carrying a large percentage of gray copper and closely resembling the ore of the Tropic mine, of which it is believed to be the extension. It has been located at the surface

under the name of the Surprise lode, and should it prove to be as good as the Tropic the company is already paid for sinking the tunnel to it. The tunnel is now in 613 ft, and has cut 10 ledges and spurs, all of which look encouraging, and several show proof of broad, strong fissures.

IDAHO.

PANAMINT MINE.—*Idaho World*, Sept. 24: The Panamint mine, at Banner, is rolling out rock at a lively rate. The force of men has been increased lately, and the Elmina mill will start up on the ore. The mill never worked better than at present.

JIM CRAW came in last Monday from Copeland and returned on Wednesday. He says 8 men are engaged at placer mining in that place, and will be through for the season the latter part of next month.

The Cluster mill, at Bonanza, will be ready to run about Nov. 1st. It will be 90 ft high, with 5 stories. It has a capacity for 40 stamps, but will start up with 25.

A shaft is being sunk on the Big Creeples, at Banner, and owned by the Elmina company. Very rich ore is now being taken out.

NINETEEN tons of ore from the Washington, the east extension of the Sub Rosa, were crushed this week in the Sub Rosa mill, and went about \$50 per ton.

GIBBONVILLE.—*Idaho Miner*, Sept. 24: Gibbonville, Idaho, across from the head of Blitter Root, has been a self-supporting camp from the start. Several arastras and 1 or 2 mills are now at work there in the reduction of gold ore, and all have paid from the very first shovelful of ore reduced. The lodes have paid their own development from the first blow of the pick struck on the croppings, and in some instances a handsome surplus besides in the way of dividends.

The new mine is now at the end of the A. T. & S. F. R. E., and will be shipped to this place, about 100 miles, the old mill at the reduction works on the Mimbre. We learn that the mill and fixtures weigh about 100,000 lbs, and is one of the most complete mills in the United States. The McGregor mine has of late been turning out some very fine ore, and in paying quantities. Several lessees on this mine are doing well. The Commercial, which lies contiguous to an area between the McGregor and Queen, has also been giving good returns. The other mines of the camp are turning out their usual quota of rich ore. The Meredith & Allman mill, now belonging to the Mimbre company, will for a while run on custom ore.

WICKES. In Jefferson county, is another most promising camp, and an inviting field for the prospector. Mr. Chas. B. Finn, of Butte, who has recently returned from a visit to Wickes, declares that it is one of the healthiest and most hopeful activity. Men are in demand, and labor is to be had without even the asking. The new 50-ton water jacket furnace will make its first run in about 2 weeks, when the industrial importance of the camp will be vastly increased, its bullion product also. The hills about Wickes have been very imperfectly prospected. To the industrious searcher for hidden treasure they hold out a promise equalled by very few other localities, even in matchless Montana.

BAY HORSE.—*Cor. Salt Lake Tribune*, Sept. 24: Capt. Rustin is vibrating around in the vicinity of Clayton City and Squaw creek, and will have his smelter ready to run in about 6 weeks. His mines all look well. The Rams Horn is the boss and is furnishing the smelter about 10 tons per day, and all the other mines along the Bay Horse mineral belt are looking well and producing ore. The Idaho Co.'s smelter on Bay Horse started up on the 15th, on Bay Horse ores, chiefly Rams Horn, and without metallic or any other lead, except what was in the ore. The first bar of bullion assayed 785 ounces of silver per ton. It is now running very smooth and giving perfect satisfaction to the owners. The bullion runs in silver up to the present date from 100 to 1,100 ounces of silver per ton, and the slags show from 1½ to 6 ounces silver per ton.

MONTANA.

ARIZONA.—*Atlantic*, Sept. 22: The immense belt of silver ore in the Argenta district is but 15 miles from Dillon. We may now expect to see the smelter there resume business, enlarge its capacity and stimulate active operations. The lodes and quality of ores are of unquestionable richness, and new capital will not be long in finding this wealth.

COL. BURELL was at Terminus Thursday. He has the Elk Horn mines, in this county, bonded, and it is reported that he is making some good clean-ups.

Four miles from Willis station several parties have lately struck rich silver mines, the ledges running 2 ft wide and assaying an average of \$150 per ton. These discoveries are in the west side of McCarthy peak, only 3 miles from the grade of the U. & N. R. R., and but 10 miles north of Dillon.

LATHROP DUNN, late of the Alice company, left for San Francisco, Saturday, to spend the winter. He thinks that Butte is destined to become the greatest and most permanent mining camp in all the West.

GLENNDALE.—*Cor. Helena Independent*, Sept. 25: The mine and works of the Helena mining and smelting company are running uninterruptedly. Every day teams are loading with bullion and matte for the Terminus. The company gives employment to upwards of 700 men at their mines at Lion Mountain and at the iron mines at Soap gulch, and at the works here. Rumor says the proposed sale of the company's property will be effected within 60 days. Quite a number of our mechanics and experienced workmen at the smelter have come to Wickes in the past 2 months. No doubt in another season Wickes will be an equal, but I hardly think a superior bullion-producing camp to this.

DRUM LUMMON.—Silver Creek Cor. *Helena Independent*, Sept. 25: Years of patient work in the prospect field have at last rewarded Tom Cruise by the discovery of the Drum Lummon, which, by the promising indications of the magnificent 60-ft lode do not fail, will be in another year the richest mining property in the Territory. Mr. Cruise and all of his employees keep reticent concerning the amount and quality of the ore taken out. The shaft is on the mountain back of the mill, which, with its 5 stamps, is crushing out, day by day and night by night, twice the amount of wealth to the capital invested than is turned out by any other mine in Montana. Numerous prospect holes are seeking extensions of Drum Lummon, but none have struck it yet.

BUTTE NOTES.—*Miner*, Sept. 24: The mines of Butte continue to show a steady improvement in the quantity and richness of the ores produced. A new body of exceedingly rich silver-copper ore has been struck in the drift running west from the main shaft of the Bell. An important strike of silver is now being constructed on the Mountain Boy. The ore much resembles that of the Anselmo, and will assay over 200 ounces. Careful estimates of the value of the bullion, ore and matte shipped from Butte place the amount at \$50,000 per week. There is no doubt that the production for the present year will reach \$2,000,000. Dounel, Clark & Larabee yesterday shipped gold dust valued at \$130,000. On Wednesday the Alice company shipped 600 lbs of bullion valued at \$10,000.

STRENGTH AT THE COPPER SMELTER.—On Thursday, at a preliminary trial of the machinery lately put in at the smelter of the Montana copper company, everything worked satisfactorily. The boilers were tested and found to be sound, and everything shown to be in excellent running order. It is expected that the smelting of ore will begin in about 2 weeks. An air shaft is now being constructed from the Colusa mine to the works, a distance of 1,640 ft. The cars will probably be propelled by steam power. By this means the 5,000 tons of concentrating ore on the dump, and the vast deposits of first and second-class ore opened up in the main level, will be conveyed to the smelter, and the heavy expense of wagon transportation entirely saved.

ANSELMO.—During the past week 40 tons of first-class ore have been shipped to the smelter, leaving 150 tons of second-class 80-ounce ore on the dump.

ALICE.—In the upper levels considerable work is being done and the different workings are being put in shape to insure a heavy production when the reducing facilities of the company are perfected. The mill is now constantly getting, and 4,000 tons of ore have accumulated at the new mill, which, from present indications, will be over-supplied in the future equally as much as the 20 stamps have been in the past.

MAGNA CHARTA.—Recent development on this mammoth ledge are of a very encouraging nature. The double-compartment shaft is being sunk as expeditiously as possible, and has reached a depth of 100 ft. It has thus far passed through 2 strata of ore, the one struck yesterday assaying 126 ounces.

GRAY ROCK.—As soon as the mill succeeds in crushing the ore now on hand, the extraction of ore will be resumed

in the west shaft, where several thousand tons are in sight between the 2 levels.

BUTTE.—During the past week an important discovery has been made in the whim shaft, between which and the middle shaft it was supposed the only rich sheet of ore in the mine existed. At a depth of 90 ft, however, a crosscut north, 6 ft to the footwall and a drift east 12 ft, developed the presence of another sheet approaching in richness the sheet which has yielded so largely of high-grade base ore. The new ore body is 2 ft wide; it carries 40% of copper and between 200 and 300 ounces in silver.

NEW MEXICO.

TRES HERMANOS.—*Grant County Herald*, Sept. 22: A. R. Bove brings in some very rich-looking specimens of gray carbonate of lead carrying silver, fair samples of the ore of Tres Hermanos district. There are now about 15 miners at work there, and all express themselves as highly gratified with the prospect. About 100 locations of ore have been made in all, but the principal mines in the district are the Astor, Hancock, Garfield, Chinchault, Hiawatha and Crockett. Many who have gone to Tres Hermanos for the purpose of working their claims, have left through fear of Indians, as the camp is liable to be attacked at any moment. As soon as the present troubles are ended, there can be no doubt that miners and prospectors will flock in from all directions.

GRANDTOWN.—Our mining interests are progressing very satisfactorily. The Mimbre mining company has just learned that their hoisting machinery will be here within a day or so. It will be only a few days until they will have it in place, when the work of sinking some of their shafts on the Nalad Queen will commence in earnest. Their new mine is now at the end of the A. T. & S. F. R. E., and will be shipped to this place, about 100 miles, the old mill at the reduction works on the Mimbre. We learn that the mill and fixtures weigh about 100,000 lbs, and is one of the most complete mills in the United States. The McGregor mine has of late been turning out some very fine ore, and in paying quantities. Several lessees on this mine are doing well. The Commercial, which lies contiguous to an area between the McGregor and Queen, has also been giving good returns. The other mines of the camp are turning out their usual quota of rich ore. The Meredith & Allman mill, now belonging to the Mimbre company, will for a while run on custom ore.

OREGON.

TIM MAMMOTH MINE.—*Beckroth Democrat*, Sept. 22: This mine, about 8 miles southwest of Port Sunlight, and about 7 miles southeast of the Monumental mine, will again begin operations to-day. It is located in the center of a large and rich mineral belt of both gold and silver. The ledge at present is about 16 ft wide, running in a southeast and northwest course pitching at an angle of 70°, between walls of granite and slate. The owners will immediately sink, raise tubs and otherwise operate to fully develop the mine. Mr. W. T. Nelson will superintend the workings of the mine, and Mr. E. D. Browne, engineer.

INYO.

HOMER DISTRICT ITEMS.—*Bodie Free Press*, Sept. 24: They are still getting rich rock from the Josie Green. We are told of a big strike on Green creek, on the northwest slope of Castle Peak. Messrs. How & Travis are having built two arastras, under the direction of J. W. E. Towns. They have about 12 tons of good rock out at the Collamer mine, and the owners propose to have it milled as soon as facilities offer. The Lake Mary mine, which has been located by J. W. E. Towns, who will immediately construct two large arastras, to be run by a hurdy-gurdy wheel. Work on the May Lady mill progresses slowly. The mortar-blocks are set and the battery frame is up, but work in general on the structure is retarded by the scarcity of lumber. We are informed that the usage above the Homer mine will soon start a tunnel just above Mill creek which will cut through the ledge 1,500 ft, using machine drills and running the compressors by water power, which is practically unlimited in that locality. Thos. Condon and Geo. Esh have been at work stripping the Young America ledge during the past week, and are making a good showing. The quartz prospects well.

UTAH.

SILVER CLIFF DISTRICT.—*Prospect*, Sept. 17: The Fannie lode is working a diamond drill, and producing gray copper. The Lumber City and Silver Cliff mining company have commenced work on their Plattsburg claim. Work has been resumed on the First Venture, next claim east of the Silver Cliff, and the new shaft makes a fine showing. The Alta Verde company received, and sent to the mine, the new 20-horse engine ordered by Col. Montgomery of Esmeralda & Davis, Denver. As soon as Messrs. Robbins & Dyer complete their new mill, it will be employed in treating the ore which is now accumulating on the dump of the Horn Silver No. 2. All the heavy machinery for the Robbins & Dyer mill is in place, and the balance of it as soon as the amalgamating pans are in the place the mill will be started. The excavation for the new Silver Cliff mill is progressing rapidly. A large number of men are employed and the work of construction will be pushed to a speedy completion. On the California, which crosses the Silver Horn, a 3-inch "ray streak" of high grade ore was uncovered, at 40 ft from the surface, all of which is being hoisted to the mill. It seems to be conceded that the California vein crosses the Jennie and Mattie claim, which lies just east of it, and in close proximity thereto, which has stimulated the owners to renewed efforts in search of the hidden bonanza within their own surface boundaries. Garrison & Cline will resume work on the Golden Gate as soon as their power hoister can be completed. In their intention to go on down to 150 ft, the owners to their discovery shaft. The new mill of Carter, Cooper & Co., in Burnt Gulch, is progressing finely. It is situated about 26 miles from the Cliff, and is built especially for the ores in North and South Crestone, Cottonwood and Burnt Gulch. It is a 3-story frame building, the frame work having already been placed in position. We understand that there are now 150 tons of material on the coast to their discovery shaft. The new mill of Carter, Cooper & Co., in Burnt Gulch, is progressing finely. It is situated about 26 miles from the Cliff, and is built especially for the ores in North and South Crestone, Cottonwood and Burnt Gulch. It is a 3-story frame building, the frame work having already been placed in position. We understand that there are now 150 tons of material on the coast to their discovery shaft. The new mill of Carter, Cooper & Co., in Burnt Gulch, is progressing finely. It is situated about 26 miles from the Cliff, and is built especially for the ores in North and South Crestone, Cottonwood and Burnt Gulch. It is a 3-story frame building, the frame work having already been placed in position. We understand that there are now 150 tons of material on the coast to their discovery shaft. The new mill of Carter, Cooper & Co., in Burnt Gulch, is progressing finely. 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Paper, and How it is Made.

No article is more common than paper in its multifarious forms, and yet how many of our readers are familiar with the various materials which enter into its composition or of the process of its manufacture? We have summarized an interesting history of the valuable industry from the Boston *Journal of Commerce*, one of the most intelligent of our eastern journals. The antiquity of paper manufacture is excelled by few other products, Chinese historians carrying it back into the twilight of our history. It was first introduced into England about the close of the 15th century, and into this country near the close of the 17th century—the first attempt having been made at Germantown, Pa., in 1693. The materials from which paper is produced are numerous and various, but wholly of vegetable origin—neither wood nor hair being capable of reduction to fibrous pulp, an essential condition in the manufacture of paper. The most common materials are linen and cotton rags, straw, the leaves and stalks of the okra plant, jute stalks, manila, wood fiber, the hulls of cotton seeds, etc. No substance, however, equals linn rags, out of which the finest and toughest paper is made. Next in value are cotton rags, from which the best writing paper is made. In the manufacture of paper great care must be taken in the selection of the material as well as in every process.

The rags are gathered from all parts of the country and arrive at the mill in bags, a part of the stock, perhaps, coming in pressed bales from over the sea. The first process is sorting, after which the rags are cut by means of a fixed blade in a bench, like a short upturned scythe, the operator picking them up by handfuls and drawing them across the edge of the blade. A second sorting, for the removal of buttons, hooks and eyes, and hard seams, follows, and the rags are then dusted. The duster is a large cylinder, the surface of which is of fine woven wire, inside of which is a shaft carrying arms set around it in a spiral form, and revolving at a higher rate of speed than the cylinder. This difference in speed gives the rags a thorough stirring, while the spiral arrangement of the arms facilitates their exit. White paper can be made from colored as well as from white rags, both the dirt and the color being removed by hoiling the rags in lime water. The rags are placed in a large rotating boiler mounted on journals and driven by gearing. Steam is admitted through the hollow journal and kept at a pressure of 45 to 60 lbs., representing a heat ranging from 292° to 308°. Lime water is mixed with the rags, and the boiler is set in motion. A charge requires from 8 to 12 hours boiling. Even this severe test does not fully purify the rags, and they are next passed through an "engine." A brief description of this apparatus will be necessary for the uninitiated. It is a tank of oval form, the walls or sides rising 2½ ft. from the floor. This is partially divided longitudinally by a straight upright partition, not extending to the ends, however, but leaving a space between its ends and the tank's sides, of a width corresponding to that between the sides of the partition and those of the tank. On one side of this partition, across the center of the tank, is a toothed drum, the teeth or blades of which alternate with fixed teeth at the bottom. These teeth tear the rags to tatters, but without destroying the fiber. A stream of water is constantly passing through the tank, and is constantly removed. This is done by a wheel of fine wire netting that revolves on the side opposite the toothed drum, taking up the mass, but detaining the pulp, the water running off through the shaft of the wheel, which is hollow. Thus the water is used only while making a single passage around the tank, the current being produced and maintained by the rotary movement of the heater or clearer. The coarse pulp which comes from this cleansing engine is technically known as "half stuff," which is again submitted to the action of another engine for still further cleansing. The material is next mixed with chloride of lime and passed through the "beating engine." It is then heaped upon drainers, and looks like a mass of half-melted snow. This white, however, is a dead white, having no brilliancy. To receive this quality it must literally be colored. As the laundress blues her clothes to make them whiter, so must the paper stuff be blueed, and when so tinted it has that same quality of whiteness as wind-driven snow, which always shows a bluish tinge. This is quite different, however, from the blue writing paper which is the favorite tint in the Southern States and in England, that is really blue paper, and is produced by ultramarine, which in the form of powder is mixed with the "half stuff" just before the final beating. Our usual white paper is merely tinted sufficiently to remove the dead, yellow, lusterless appearance of absolute whiteness.

After passing through these processes the material is apparently a thin, milky fluid, having no trace to the eyes of any fibrous quality. Formerly paper was formed by hand, the workman dipping a rectangular sieve into the fluid pulp and depositing the sheet of pulp on a piece of felt to dry. Very little paper is made so now, the Fourdrinier machine having taken the place of the hand of the workman. This machine is a marvelous production of skill; it is almost wholly automatic, and does its work with absolute exactness. A brief account of its work will assist in its comprehension. Some of these machines are not less than 6 ft. wide and 75 ft. long, requiring a building by itself,

and making a sheet of paper over 5 ft. in width. The pulp is pumped into an elevated tank, from which it is delivered to the machine through an adjustable gate opening from a reservoir. The amount of pulp fed to the machine regulates and determines the weight of the paper, and of course it must be governed absolutely and exactly, the speed of the machine being constant. The pulp flows on to a roller, which deposits it on an endless apron of fine woven wire, which has a constantly jarring motion, tending to shake out the water and aid in the homogeneous union of the particles. Thick rubber straps on each side of the endless apron determine the width of the sheet. Passing between rollers which compress it, the sheet of pulp goes over perforated boxes from which the air is exhausted by a pump, and much of the remaining moisture is driven out by atmospheric pressure. A bath of liquid glue gives a proper sizing to the sheet after it is fully dried by cylinders heated by steam. The sheets, dampened by glue, are taken to a drying room, from whence, all wrinkled, they are submitted to a calendar consisting of a stand of rolls, three of chilled iron and two of paper. These latter are made of manila paper cut in disks, with a hole for the axis or shaft, and compressed by hydraulic pressure. When turned and finished, these paper rolls are as smooth and almost as hard as iron, presenting a highly finished surface. The sheets are then trimmed by a machine suggestive of the guillotine, and ruled. The pens used on the ruling machines are of peculiar form, made of sheet brass and fed with ink by a wick.

Book paper is made of old paper entirely, and the processes are similar to those for making paper from rags, except that they are not so long continued. "Juted" is used for making coarse paper, such as is used extensively for flour bags, for which it is well adapted, being very tenacious of fiber. One of these bags holds a quarter of a barrel of flour, 49 lbs. Jute stalks are imported from Calcutta, and are the same material from which gunny cloth and bags are made. The stalks, which are usually 10 to 14 inches long, pass through a rotary cutter, with stationary knives and knives set in a cylinder, by which they are torn to coarse threads. A hoiling under steam pressure in a rotary boiler, with lime, follows, and the mass is heaped and allowed to "sweat" a few days. Then the material is passed through the cleansing engine, is bleached with chloride of lime, and sized with resin and washing soda. The after machinery is similar to that used on writing paper. Fine wrapping paper and envelope paper are made from old manila rope, and paper for collars is made from cotton rags; and in both cases the processes are similar to those employed in the manufacture of writing paper. An essential requisite in the manufacture of paper is pure water, and paper mills are never found on the banks of sluggish streams or the margin of a marshy, muddy pond. The coloring matter for imparting the various tints to paper is introduced into the beating engine when finishing the "half stuff."

Nevada County Mining Statistics.

There are 45 quartz mills in Nevada county, having an aggregate of 503 stamps, and a crushing capacity of about 750 tons per day. They are divided among the various townships as follows:

Nevada—Deadwood, Murchie, Merrifield, Providences, Wyoming, Nevada City, Pittsburg, Thomas, Martin & Mitchell, Eureka No. 2, Spargo, Kirkham, Crosby, Keith, Stiles, Sneath & Clay, Pennsylvania. Number of stamps in Nevada township, 153.

Grass Valley—Idaho, Scadden Flat, Larimer, Omaha, Bullion, O'Connor, Godfrey (cement), Orleans, Coe, Empire, Alpha, Rocky Bar, Allison Ranch. Number of stamps in Grass Valley township, 180.

Eureka—Parsons, Birchville, California, Great Republic, Rocky Glen, Booth. Number of stamps in Eureka township, 78.

Washington—Patterson, Marker, Yuba, Fall Creek, Diamond Creek. Number of stamps in Washington township, 60.

Rough and Ready—Ironclad, Hudson, Osceola. Number of stamps in Rough and Ready township, 22.

Little York—Sargent & Jacobs (cement), 10 stamps.

The assessed value of mining claims and improvements in the county is \$2,358,640; value of mining ditches, reservoirs, etc., \$1,051,495; total number of mining ditches, 217; number of miles of mining ditches, 524.

HELL'S FIRE ROCK.—Miners are not in the habit of throwing up good contracts for nothing now-a-days; but the Ada mine, in Snake creek, is idle at present, and will be for some time to come, unless some of our rock sharps give a solution to a geological phenomenon which still puzzles the miners of that section. In driving the tunnel, which is now in over 100 ft., a strange formation was encountered. At every stroke of pick the tunnel was filled with luminous vapor, and the weird light made the blood chill in the veins of the superstitious miner. It is needless to say that the contractors dropped their tools and left, and the owners of the property could not induce them to resume their work. They call the rock "hell fire rock," and give the tunnel a wide berth. Some of the rock is being analyzed, and we shall give the result as soon as ascertained. It is probably phosphoretic rock.—*Salt Lake Tribune*.

The Outlook at Bodie.

The present outlook of the mining interests in Bodie, says the *Standard-News*, considering the age of the camp, could not be improved. Within three months the ponderous machinery of the Red Cloud will be in motion and the work of sinking that shaft to a depth of 2,000 ft. prosecuted with all vigor. This will take the water from the Noondays, Oro, Mayhell, Concordia, and permit of their being worked to good advantage, and but a few months will then pass before the full value of the Silver hill mines will be made known, as all that now retards the work being the heavy body of water encountered. The Red Cloud works are this entering wedge for the same character of works that experience has proved must be built on the line of the main Bodie lode before it can possibly be opened up at great depths. Not less than three such works must be erected before Bodie can hope to be placed in that rank of mining camps which the solid merit of her mines entitle her. With proper drainage facilities Bodie will open up to the mining world the richest and most extensive ore bodies ever uncovered. We make this statement purely from the indications shown along the whole length of the line that inevitably point to this conclusive fact. It is true none can positively tell of matters not in sight. Yet, it is equally true that all mining experience proves that stringers, seams of ore and small ledges are but offshoots from large ore bodies, and if followed always lead to them. Twenty years' mining on the Comstock establish this proposition correct, and all the mining experience of the world supports it. We see it exemplified to-day in the Bodie mines, and therefore our conclusions that our mines can be no exception to the rule. It must be remembered that the mines of Bodie are, as yet, almost in virgin soil. Two years since they were all but two or three worked with windlass and whim, the windlass being largely in the majority. Within the past year 25 steam hoisting works have been built and the work of development prosecuted to the water levels. Here it must rest until powerful machinery is set up at such points on the line of the lead as will insure the drainage of the whole line. This can only be done by a combination of the different companies, as the expense is entirely too great for a single company to handle. This proposition every moneyed man understands, and but a short time will pass before it will be acted upon, and the fame of the deep mines of Bodie will extend throughout the mining world, built upon a basis that stock manipulators cannot shake.

Poverty Flat, Idaho.

A correspondent of the *Salt Lake Tribune*, writing from Challis, Idaho, says: Going again up the creek, an ascent and a trail ride of five miles south, brings us to Poverty Flat district, where the Redemption mine is being worked so successfully that during the past month they have taken out 350 tons of good ore, which will well repay for shipping. Near the Redemption we find the Vermont, Broadway, You Know, I Know and others, all being good mines, and being on the same belt as the Ram's Horn, are very similar in quality.

Further up the Salmon river, five miles, comes the district of Killinick, of which Clayton is the town, and location of the Salmon river mining and smelting company, having the following management: Capt. C. B. Rustin, President; Gen. W. W. Lowe, Manager and Treasurer; and W. S. Causland, Superintendent. The works will be in operation within the next three weeks. A wagon road connects Clayton with Crystal, the distance being four miles, and crosses a bridge over the Salmon. By means of this bridge, 180 ft. long, and a road running up the East Fork, a shorter route is obtained for an outlet towards Blackfoot. The districts here described are rapidly coming to the front as ore producers, while the two smelters will, by giving a market for ores, be the means of bringing the mines to that of profitable producers.

FUTURE MINING.—Mining will soon rank among the leading scientific industries of our country. It is only just beginning to be understood. The shadow shafts and short tunnels scattered through the vast mineral region of the great West are as nothing to what the next generation will see. The few great lodes that are worked will yet be surpassed by greater ones. Miners are beginning to learn that in order to find immense lodges, great depth must be attained. At present even but little is known what riches the earth has in store for the future miner. The mode of operations carried on by the miner of early days is now considered child's play, and in years to come the same opinion will be entertained of us. Ten years from now there will be shafts on Bodie bluff and High peak 2,500 ft. in depth, and the machinery will be of the most improved order. The indications now are of such a nature that it is not unreasonable to predict that Bodie will surpass the Comstock in its most glorious days. There are many who believe this and will stay with the camp as long as there is a steam engine at work on the hill.—*Bodie Free Press*.

THERE are now 12 mining districts in Grant county, New Mexico, and there will be double the number at an early day. The prospecting parties which have gone out since Victorio crossed the line, cannot fail to find something. The whole county is seamed with mineral belts.

A Long Island Trout Farm.

We are interested to learn from Eastern papers of the success of a fish-farming enterprise on Long Island, which has been developed by Geo. W. Thompson, who is an old Californian, and during the latter part of his stay in this State was a resident of Brooklyn township in Alameda county. What Mr. Thompson has done at the East may serve as a hint for similar enterprise to some of his old friends who still remain here, for California has many sites well adapted for such work. We shall take from the accounts at hand some interesting paragraphs:

Long Island is noted for its trout farms, and many of them have attained a just celebrity. Most of these trout preserves are situated near the center of the island or at its western end, the only one on the east end being the Noyac trout farm. This farm is owned by Mr. Geo. W. Thompson, who came to Noyac from San Francisco about six years ago. Before Mr. Thompson's purchase of the tract of land now comprising the trout farm it was a perfect wilderness of underbrush and trees. There are now 40 springs upon the place from which the various ponds are supplied, but when the present proprietor entered upon the land a small brook, leading into a pond that supplied the motive power to an old grist mill, was the only water course.

Preparing the Ponds.

The first thing this new proprietor set about doing was to clear the land of underbrush, thin out the trees and convert the brook into a series of ponds suitable for trout propagation. The ponds were dug by hand in such a manner as to give a pleasing variety of outlines, and graded in such a way as to allow the stream an easy fall from one reservoir to the other. There are 30 of these ponds altogether, ranging in size from 15 to 20 ft. in length to an extent of three or four acres. They are separated by wide screens in order to keep the different growths of trout apart. The water takes its course through the most sequestered nooks upon the place, over rocks and pebbly bottoms, and in the shadow of trees and bushes; thus making the preserve as much like the natural haunts of the fish as possible.

In the autumn when the leaves are falling they would soon cover up and sully the water were it not for an ingenious contrivance which Mr. Thompson invented to remedy such a state of affairs. From one pond to the other there is a slight fall of, perhaps, a foot or more, and the flow of the water causes the leaves to cluster about the dividing screens. Where the leaves gather thickest a large wire fly-wheel is placed, turned by the stream itself, which snags in all the light debris and throws it up on the bank on each side. In this way a perfectly clear water course is always insured. To obtain a larger supply of water for hatching, nursery and other purposes, the 40 springs, previously mentioned, were dug, and thus in the driest times of summer there is no fear of dearth of water.

After clearing his land and making the necessary reservoirs for his fish, Mr. Thompson commenced raising trout for market. It requires great familiarity with the habits of trout to be able to tell exactly at what time the female trout is ready to spawn, and it requires equal skill and judgment to treat the fish in such a way that they will experience no ill effects after the spawn is taken from them.

Gathering the Spawn.

When the spawning season arrives the experienced eye can easily detect when the eggs of the female trout have reached maturity. The fish are caught in a light net and put into tubs of clear water. Pans purposely made for the reception of eggs are then placed in readiness, and the female trout are relieved of the spawn in the following manner: The fish is held near the head with the left hand, and the right is clasped around the body just above the abdomen. Then with a gentle downward movement of the right hand the eggs are forced from the trout into the pan. The male trout is then treated in the same manner, contributing a milky fluid, which is dropped into the same pan with the spawn and causes fecundation. The fish, both male and female, are much exhausted after this operation and unless placed where they cannot be molested they are apt to become sickly and die. They are usually put in a separate pond until fully recovered, when they are allowed to mingle with other fish of their own size.

Hatching the Eggs.

The hatching trough is a long narrow box divided into compartments, into which the eggs are placed according to their different stages of maturity. The sides of the trough are charred to prevent the growth of fungi, as any impurity is deadly to the life germ of the eggs. Water from a large reservoir is kept continually running through the hatching trough, and so great is the need of keeping it clear of all impurity or any kind of sediment that before entering the hatching boxes it is forced through seven filters of finest flannel. The time of incubation varies from a few days to much longer terms, according to the character of the season and the various stages of maturity of the eggs.

When the fish are hatched they are minute creatures with a curious little transparent sac attached to the stomach. The sac disappears as the fish increases in size, some theorists attri-

hunting their disappearance to the fact that they furnish sustenance to the young fish, and are gradually absorbed until they are capable of feeding themselves. When the young trout reach this stage they are taken from the hatching trough and placed in what are called nurseries, which are simply a series of large wooden compartments with latticed covers to protect the young trout from their enemies of the air and held. These compartments are separated by wire screens, and through them all flows a shallow stream from the reservoir up the hook. The nurseries are constantly filled with young trout, the various sizes being kept in different compartments. This is a very necessary precaution, for trout are cannibals, and unless great care is taken to keep the larger fish from the smaller the latter would soon be destroyed.

As the trout grow they are removed to larger nurseries, where they are kept until they attain a size of two and a half or three inches, when they are again sorted and placed in the larger ponds.

Sorting and Feeding the Trout.

The process of sorting the trout is, it may be said, of almost continual duration. As soon as a trout outgrows his companions he is caught in a net and placed in more suitable company; for if left among the smaller and weaker fish, he would soon display his cannibalistic propensities. This, of course, applies only to the younger fish, for a three-pound trout would probably find it discouraging work to try and dispatch a two pound brother. Brook trout rarely attain a weight over three pounds, though Mr. Thompson has some beautiful specimens which will weigh nearly four pounds; but they are exceptional cases.

The trout are fed at stated times every day, the food in summer consisting of minnows and other small fish caught in the neighboring coves and bays, and in winter, of beef chopped fine in a machine made for the especial purpose of preparing trout food. The price the trout fetch in the New York markets varies from \$1 to \$1.50 per pound according to the season.

Mining in Colorado.

Mining business during the year 1881 will advance to the front as the favorite industry of the country, and the hulkion product of that year will probably double that of the combined years of 1879 and 1880. Local papers throughout the different mining camps report an increase of population; and of Colorado, Arizona and New Mexico it can be said without exaggeration that more capital will be invested during 1881 than has been within the past five years. Even Leadville makes daily reports of news and rich strikes, which astenish those not already familiar with the formation of that most wonderful camp, without doubt the richest in the world. Silver Cliff is building more mills, and immense ore bins are full, awaiting the completion of the mills. In the meantime, ore running into the thousands of dollars is being taken from mines where heretofore only low-grade ore has been found, thus proving conclusively that with depth silver mines become richer in their precious product. The recent rich finds at Chubb's, on the line of the Denver, South Park & Pacific railroad, has caused the organization of a company to erect reduction works there, while another enterprising company has laid out a town site. The Gunnison country, although much abused by a certain class of interested parties, is without any doubt destined to materially increase Colorado's hulkion product during 1881. The great southwest, which embraces the ever-popular San Juan country, will employ over 20,000 miners next year, extracting the gold and silver from her everlasting true fissures. The other countries, Clear Creek, Boulder and Gilpin, are too widely and favorably known to require any statement regarding their future. Since the discovery of the precious minerals they contain they have contributed a steady income, and their hulkion product will no doubt increase during next year as rapidly as will that of any other district in the State.—*Rocky Mountain Mining Review.*

PROVIDENCE HOISTING WORKS BURNED.—On the 21st inst., at six A. M., the town of Nevada City was startled by a fearful explosion and a dense smoke arising from the vicinity of the several mines on Deer creek, one mile west of town. It was soon learned that the Providence company's hoisting-works were on fire, and that several boxes of Giant powder had exploded, blowing huge timbers and fragments of the burning building in every direction. Fortunately, no one was injured. The origin of the fire is unknown, but it is supposed to have caught in the furnace-room and to have gained such headway before being discovered that the only occupant of the building, the engineer, had no opportunity to remove the powder or suppress the flames. As the fire occurred between the hours when the night shift leave and the day shift go on, there was no one in the mine. The mill buildings of the Providence and the Merrifield works, directly across the creek, were saved only by the energy of the attaches of the several mines in the neighborhood. In addition to their hoisting-works, the Providence lost 800 cords of wood. Their loss of property and the damage resulting from the stoppage of the works and the filling of the mine with water, will fall not far short of \$50,000. There is no insurance. The owners of the Providence property will commence immediately to erect much larger and more extensive works.

USEFUL INFORMATION.

Theory of the Injector.

The explanation of the action of this apparatus, which is generally accepted as the correct one, we give below, substantially as given by Knight. It should be added, however, that there are a number of peculiar features about the action of injectors which are not fully understood, or, at least, upon which engineers are not agreed as to their proper explanation. The general principle of their action is stated, however, as follows: Under a given pressure, the velocity of escaping steam is much greater than that of the water which would be ejected were a hole to be opened in the boiler below the water-line. At a pressure of (say) 90 lbs. to the square inch, the excess of velocity of the steam is about in the proportion of nine to one. As the escaping steam in being condensed, loses none of its velocity, except that due to the friction of the pipes through which it passes, it consequently, after condensation, has a penetrating force about nine times greater than the resisting power of the water in the boiler. At the moment of condensation, it imparts its momentum to the water by which it is condensed, and with which it mingles. For instance, 1,700 cubic inches of steam, on being condensed to one inch of water, imparts sufficient momentum to eight cubic inches of water, by which it is condensed, to exactly balance the pressure of water in the boiler. In this case the opposing forces are in equilibrium; but, combined with any less quantity of water, say seven cubic inches, the momentum will more than suffice to overcome the resistance of the water in the boiler, and the mingled condensed steam and water will force its way into the boiler if a properly-constructed entrance is provided for it.—*Manufacturer and Builder.*

PRESERVING TIMBER IN GROUND.—In speaking of the well-known methods of preserving posts and wood which are partly imbedded in the earth, by charring and coating with tar, it is said these methods are only effective when both are applied. Should the poles only be charred without the subsequent treatment with tar, the charcoal formation on the surface would only act as an absorber of the moisture, and, if anything, only hasten the decay. By applying a coating of tar without previously charring, the tar would only form a casing about the wood, nor would it penetrate to a depth which the absorbing properties of the charcoal surface would insure. Wood that is exposed to the action of water or let into the ground should first be charred, and then, before it has entirely cooled, be treated with tar till the wood is thoroughly impregnated. The acetic acid and oils contained in the tar are evaporated by the heat, and only the resin left behind, which penetrates the pores of the wood and forms an air-tight and waterproof envelope. It is important to impregnate the poles a little above the line of exposure, for here it is that the action of decay affects the wood first, and where the break always occurs when removed from the earth or strained in testing.

GLASS WICKS.—Lamp wicks of spun glass are made in Germany. They are said to supply the petroleum, oil or spirit more regularly, and lamps that are provided with them can be carried about with less danger of going out or scattering sparks and kindling conflagrations. For equal strength of flame the glass wicks give a purer and clearer light; they have a less unpleasant odor; they consume less fuel; in spirit lamps they give a more intense heat, with a more quiet and steady flame.

WHERE THE MONEY GOES.—A French writer states that the Egyptians conceal \$20,000,000 annually of the precious metals; and the Emperor of Morocco has filled 17 large chambers with gold and silver. The solution of the problem of the disappearance of the precious metals from the countries where they are produced, is that the Orient is the reservoir into which continually flows the gold and silver of the Occidental reservoir from which there is no ebb.

CAUSE OF THE LATE ADVANCE IN IRON.—It is said to have been the greed of consumers that led to the heavy importation of iron during the last 10 or 12 months, and not the inability of our manufacturers to supply all the iron the country needed. The *Enquirer* happily remarks: "The United States have at the present more iron than they can possibly use, and facilities for producing at any time more iron than they want—always provided that the consumer does not insist on having supplied to him in one year as much iron and steel as he can use in two years."

ELECTROTYPING WITH IRON.—Herr Bottger describes a process for steeling copper plates by electrolysis. One hundred parts of ferrous-ammonia sulphate, together with 50 parts of sal-ammoniac, are dissolved in 500 parts of pure water, a few drops of sulphuric acid being added to acidulate the solution. The copper plate is connected to the negative pole of a battery of two or three Bunsen elements, an iron plate of equal size being employed as an anode. The solution is maintained at 60° to 80°. The deposit of iron is of a hard, steel-like quality.

WATERPROOF GLUE.—Glue may be made waterproof by adding about one part of bi-chromate of potash, first dissolved in water, to every 30 or 40 parts of glue; but you must keep the mixture in the dark, as light makes it insoluble. When you have glued your substances together, expose the joint to the light, and every part of the glue thus exposed will become insoluble and therefore waterproof. If the substances glued together are translucent like paper is, all will become waterproof; if opaque like wood, only the exposed edges will become so, but they also protect the interior—not exposed parts—against the penetration of moisture.

TO KEEP GRAPES.—Take full bunches, ripe and perfect; seal the end that is out from the vine so that no air can get in, or the juice of the stem run out, and let them stand one day after sealing so as to be sure they are perfectly sealed (if not they will shrivel up); then pack in boxes of dry sawdust and keep in a cool place. They will keep nicely all winter without losing their flavor. In packing do not crowd the bunches; sprinkle the sawdust over the bottom of the box, then sawdust and grapes, alternately, until the box is full.

WOOD CARVING is an industry which is carried to considerable perfection among the Germans, and is fostered by the establishment of carving schools, particularly in districts where the wood used for the work—Spanish walnut, the best walnut the Germans have—is plentiful. There are now 80 such schools in Germany.

TRANSPLANTING EELS.—The French engineering corps has been experimenting for some years past on the transport of young eels by railway, in order to supply various streams in the different departments. Very little care is necessary except to avoid shipment when the temperature descends below the freezing point. They have already successfully transplanted about 1,500,000 eels. The eel would be a useful fish for propagation in California waters.

COMPETENT judges assert that there is no more beautiful wood for ornamental cabinet work than the curled pine of Florida. It is eagerly sought after by European furniture makers, and much of it is shipped from Pensacola. It is said to be difficult to work, and must be handled by the best mechanics with the best tools; but the results obtained amply repay the care and skill expended on it.

SOLDERING LIQUID.—Dissolve scrap zinc in excess in hydrochloric acid by means of heat, neutralize the free acid with water of ammonia, and dilute with an equal bulk of water.

GOOD HEALTH.

Symptoms of Consumption.

Cough is not an early symptom of consumption, necessarily, for there are many cases on record in which cough was not an observed symptom until within two or three weeks of death, and on examination the lungs presented a diseased mass, hurrowed with cavities. Spitting blood is not an early symptom of consumption, necessarily, for about one-third of those who die of that disease do not spit blood at all. Among the very earliest symptoms of forming consumption are combinations of the following, not all, perhaps, observable in any one case: A quicker pulse than common, a paler face, easily chilled after eating, more readily put out of breath than common, less fullness of flesh than usual at the corresponding season of the year, an unusual feeling of unrest on getting up in the morning, a greater tendency to coldness of the hands and feet, every now and then a day passing without any action of the bowels, with a very bad taste in the mouth when first waking up in the morning, a cold is easily taken, is more frequent, and lasts longer and longer, until one cold runs into another, making the confirmed cough, so ominous of approaching ill.

It will be seen at a single glance, from these symptoms, that they all indicate one thing, and that one thing is at the bottom of every case of consumption—a want of vitality; that is, a want of general vigor of system, a constitution.

But of all the things named, it will be more practical to select the two which are seldom if ever absent, in any of the above combinations which result in consumption; hence it is important to be at some pains in stating them in their hearings. A quick pulse and a short breath pervade the disease from its earliest beginnings, during its entire progress, and down to its fatal end. Multitudes of lives might be saved yearly, if these two symptoms were promptly and wisely attended to. The importance of so doing, no language can adequately portray, and if it did, the people would not attend to it, with only here and there an exception. But a great truth is of small seed and of slow growth: yet that growth is certain, and its spread uncontrollable—the more so, as education becomes more general.

The pulse heats about 68 times in every minute of healthful adult life. The range is from 66 to 72. When it is below 66, there is something at fault; when it is over 72, during all the hours of the 24, there is always disease, and if it continues so for weeks and months, there is the strongest ground for apprehension that consumption is approaching. A pulse steadily over

80 beats in a minute, for weeks together, is a forerunner of consumption.

Whatever may be said of auscultation, of sounding, of expectoration, there is in none of these a guide as sure as the condition of the pulse, with the aid of a competent interpreter. It is said that the physicians among some of the Orientals are not allowed to see their female patients, the hand only being put out through the bed curtain, and by feeling the pulse, prescriptive must be made. If the powers of life are being pressed to death, the full, soft, slow pulse tells it in an instant; if active, and actual destruction of organic life is taking place in the body, the inflammatory pulse, quick, wiry, angry, spiteful, at once raises the note of alarm. Every physician knows how gratefully the pulsation, as of woolen yarn beneath his finger, strikes upon his perceptions, on some urgent call, and how troubled if it gives the feeling of a quick vibrating small wire. The multitude of shades of difference between these carry with them their varied impressions, all highly instructive.—*Hall's Journal of Health.*

A Vice that is Sapping Manhood.

If the youth of the present day gave but a thought to the injurious effects of cigarette-smoking, and sturdily tried to avoid the pernicious habit, we are convinced that both their mental and moral well-being would be vastly improved. It has been often stated by good authority that the indulgence of this habit on the part of our youth tends to degenerate the physical stature of the person who is a slave to the cigarette. It may seem a graceful accomplishment to roll the fragile piece of paper with dexterity. There may be an innate desire on the part of an ambitious youth to arrive at that stage in the process of cigarette-smoking when one can swallow the smoke which arises from the tobacco and paper, and let the blue cloudlets find egress through the nose. But we warn our youthful readers that in becoming such adepts in the art which is sapping their manhood, they have entered upon a course which will eventually bring them to an early grave.

Perhaps the injurious effects of this habit would not be so bad where it is not for the vile adulterations which enter into the manufacture of both paper and tobacco. The demand for this form of smoking has been so great, that the market is flooded with imitations made of the worst paper, and the cheapest refuse of the tobacco factory. A physician in New York recently analyzed a cigarette, and found the tobacco was strongly impregnated with opium, while the wrapper, which was warranted to be pure rice-paper, was found to be the ordinary quality of white paper, whitened with arsenic! Thus does the death-dealing abomination stalk through the land, dwarfing the mind and deteriorating the body. A recent writer has said that our next generation will be born of puny-chested, slim-legged, small-necked chaps, and what kind of a generation it will be! Idiots and monkeys! This may seem drawing it rather strong, but we have no doubt that it is not in the main correct. It is truly shameful to see a little fellow not higher than your knee puffing away as if his very life depended upon the effort. It needs the most watchful care upon the part of parents to try and check this tendency to an evil habit in their children. If the consequences of their actions, and the fatal results which an indulgence in cigarette-smoking would have upon their future life were forcibly impressed on them, we think our youth would try to avoid the habit. But if they hid defiance to all parental and friendly council, and continue upon their dangerous course, we can truthfully tell them they may as well give up all chance of ever becoming worthy citizens of this great republic. When manhood is about enfolding its charms to their gaze, it will find them weak, spiritless and unambitious, and they cannot if they would enter upon the race which leads to performance and honor. The vice of their youth has incapacitated them from fulfilling all worthy endeavor. We hope our young readers will give heed to these warnings, and not be so foolish as to pursue a course which will eventually be their ruin. A hint to the wise is sufficient.—*Pacific States Watchman.*

TO CURE FITS OF SNEEZING.—A correspondent of the *British Medical Journal* says: "During the recent rapid change of temperature I caught a severe cold in my head, accompanied by almost incessant sneezing. My unfortunate nose gave me no rest. The slightest impact of cold air, or passing from the outside air into a warm room, equally brought on a fit of sneezing. In vain I snuffed camphor and pulsatilla; the light catarrh still triumphed over me. At length I resolved to see what the maintenance of a uniform temperature would do toward diminishing the irritability of my Schneiderian membrane, and accordingly I plugged my nostrils with cotton wool. The effect was instantaneous: I sneezed no more. Again and again I tested the efficacy of this simple remedy, always with the same result. However near I was to a sneeze, the introduction of the pledgets stopped it at once. Nor was there any inconvenience from their presence, making them sufficiently firm not to tickle, and yet leaving them loose enough to breathe through easily." This is really worth knowing, for incessant sneezing is among the greatest of smaller ills, and it seems only a rational conclusion to hope that this simple plan may furnish the most efficient remedy against one of the most distressing symptoms of hay fever.



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The Week.

The week has been characterized by no startling occurrences in the world of mining. The winter will soon be upon us, and many mines at high altitudes will have to close down for the season. With the advance of winter prospecting will to a great extent cease, and the prospectors will have to come back to the camps for a while. The summer campaign has been vigorous and the results are many new mines.

In another column we give the result of the investigation into the Imperial mine disaster. Strange to say, the blame is fixed upon the managers, who are charged with criminal carelessness in using a worthless rope. This is a most serious charge. An old miner once made a suggestion in this connection, which was to have one of the directors go once a day down the shaft. If that was part of his duty he would see that the cages, hoisting gear and all appliances would be all right and of first-class make.

The condition of the mining industry generally all over the United States, wherever mining is done, is excellent. More people are taking up mining as a legitimate investment than ever before. As soon as this principle becomes well understood, and stock transactions paid less attention to, then will the golden era of mining be fairly instituted.

The Presidential party was received with great honors at Portland, Oregon, last Wednesday.

The President's Visit to a Hydraulic Mine.

On Friday, Sept. 24th, the Presidential party, accompanied by Gen. McDowell, U. S. A., and Gen. Bidwell, of Chico, visited the mine of the Spring Valley Hydraulic Gold Company at Cherokee, Cal. They left Chico at 8 A. M., accompanied by a large number of residents in buggies, and, after a ride of 25 miles, reached this mine a little tired and somewhat dusty. Mr. Waldeyer, the Superintendent, met the party at the foot of the mountain and escorted them up the company grade, following the tail flumes and passing the under currents a distance of three miles to the main works.

Here they were received by a brass band, and a salute of pipe-clay blasts to the number of about 200, each explosion hurling into the air fragments of earth, and producing a continuous and prolonged fusillade which was a novelty even to the veteran experience of Gen. Sherman.

The large machine shop of the Company had been transformed into an evergreen bower for the accommodation of the guests, and after the party were sufficiently rested and had partaken of lunch, they were taken into the east opening of the mine where the pipes were playing on the bank. The bank at this place is 400 ft. in height of fine white gravel, and the pipes with a nozzle seven inches in diameter discharge 1,000 inches of water, having a pressure of 312 feet.

President Hayes, under the tutelage of Mr. Waldeyer took charge of one of the pipes, and seemed surprised and charmed with the wonderful disturbance he made among the massive rocks and the ponderous masses of soft gravel he brought thundering down the bank, not to speak of the deluge of spray which he managed from time to time to sprinkle upon his audience. Gen. Sherman tried his hand also, but his appreciation is warped by a professional eye, as he simply remarked: "What a magnificent engine with which to breach a wall."

The party were then taken into the south opening on Table Mountain, and the water turned off to allow them to inspect the flumes and the system of gold saving in hydraulic workings. The flumes are here paved with blocks and are rich in amalgam. Mr. W. explained the process of quicksilvering, etc., and exhibited the rolls of amalgam as they lie in the interstices between the blocks. He then gathered together a ball which he presented to Mrs. Hayes as a sample of quicksilver gold and a souvenir of Cherokee.

They then visited another opening on the lower bedrock, where a large water derrick was working in the blue gravel stratum, and witnessed the process of raising boulders weighing six to eight tons from the pay bottom and depositing them with the greatest ease and rapidity in piles 60 ft. high and 200 ft. away. From here they went to one of the northerly openings, where a bank blast was fired by electricity, the leading wires being carried far out so the party could inspect the process of firing; and when the knob was turned back, with a concussion scarcely greater than the tap of a finger, and they instantly felt the earth quiver beneath their feet and saw the distant earth and rocks rise like the bursting forth of a volcano, the ladies looked appalled and the gentlemen surprised, notwithstanding they were quite prepared for the shock.

The party then repaired to the machine shop where about 200 children, carrying hammers and marshaled by Miss M. A. Walsh, presented to Mrs. Hayes an address of welcome to which she replied. Mrs. Hayes having expressed a desire to witness a sample of the panning process of '49, a workman was sent for a pan of gravel, which was by courtesy taken from one of the richest ground sluices, and after the contents had been washed down to a reasonable weight, Mrs. Hayes was induced to seat herself beside the pool and complete the panning process, which was accomplished in quite a dextrous fashion for so recent an immigrant. The result was several dollars in fine gold and one or two small nuggets. None of our Argonauts in the olden time could have been more pleased with his first-found prospect than Mrs. Hayes when she wiped the mud and water from her hands and exhibited her prospect, shining among the particles among the black sand.

At 3 o'clock the party left for Chico and expressed themselves highly delighted with hydraulic mining. This is the only mine thus far visited by them in California, and they regretted that they were obliged to leave so soon. The day's trip was a most exhausting one, consisting of a wagon ride of about 50 miles of not the best of roads, and four active hours' climbing over the rocks at the mine, but they expressed themselves as fully repaid for all the fatigue and discomfort. Mrs. Hayes noticeably moved around over the rough trails with the greatest ease and rapidity, and she showed more endurance and appreciation than any woman who has ever visited the mine.

On their way down the mountain the attention of the President was called to the deposit of tailings extending into the Sacramento Valley, and the conflict between the miner and farmer visibly presented, as well as reference to the eventual harm to the rivers, and a claim made for Congressional aid in behalf of all parties interested, as all hold titles from the same source.

Limestone not a Mineral.

The Commissioner of the General Land Office has rendered a decision in the case of Elias Jacobs, which is one of importance to miners. It seems that Jacobs made application to enter, under the laws providing for the sale of mineral lands, a certain tract in Tulare county, in this State. He proved that the limestone was of good quality, and the land more valuable for its limestone than for agricultural purposes. His claim was for 1,500 by 600 ft., and was duly recorded and application for patent made. James Newton filed an adverse claim, basing his allegation of ownership on his pre-emption claim involved in the case of said Newton vs. the S. P. R. R. A protest, dated Aug. 1, 1879, was filed by the attorney for the S. P. R. R. Co., setting forth that limestones is not usually classed mineral, and that at the time of the grant to said railroad company only the precious metals were dealt with by the Government as minerals in its disposition of land, and was not intended to be excepted from the grant to said company.

The Commissioner was not aware of any application ever having been made under this act of 1866 for a patent on a limestone ledge; but when the land was agricultural, the existence of limestone constituted no objection to its entry as such.

The Commissioner is of the opinion that the act making the grant to the railroad, did not except as mineral such as were simply valuable from deposits of limestone, for such lands under the laws then in force were not subject to disposal as mineral. He says further: "I find in the statute books an act of Congress providing a specific mode for the acquisition of title to lands valuable chiefly for stone. This act, which was approved June 3, 1878, provides that lands of such character in the State of California shall be sold to qualified applicants at the rate of \$2.50 per acre."

"I entertain grave doubts that limestone should be classed as a mineral, or disposed of as mineral land under any of the laws of the United States. If such lands are to be classed as mineral, they must necessarily be reserved from disposal under the laws providing for settlement rights, and in that manner parties who are now occupying lands for agricultural purposes, and who have, perhaps, made extensive improvements, would be prevented from acquiring title under the pre-emption, homestead or other agricultural land laws."

"The act of June, 1878, may be considered a Congressional interpretation of the mining laws then in force, to the extent of holding that they did not provide a mode for the disposal of land valuable chiefly for stone. But in carrying out the idea of classification, the moment land valuable for certain character of stone is decided to contain 'valuable mineral deposits,' it is no longer, unless the mineral is useless on account of the expense and labor in procuring it, subject to entry under the various agricultural land laws, and is excluded from all grants of land which make an exception of mineral lands."

"In my opinion lands valuable for limestone do not necessarily fall within the classification of lands as mineral under the opinion of the honorable Attorney-General."

"And in view of the fact that since said opinion was rendered, Congress has by legislation provided a special mode for the sale of such lands, I am not inclined to treat them as mineral."

"In treating of the classification of land into mineral and agricultural, I am not strictly confined to the geological terms and definitions. Lands which are principally valuable for agricultural pursuits, may contain mineral deposits, as the term mineral is scientifically applied. Under the United States mining laws the deposit should be a valuable mineral; and in the administration of the law, I am often called upon to decide in a case between agricultural claimants and mineral affiants whether the land is more valuable for agricultural than for mineral purposes."

From this decision it will be seen that lands in California containing limestone and useless for agricultural purposes, can be purchased only under the timber and stone act of June 3, 1875.

WHAT came very near being a very disastrous accident occurred on Sunday night on Oakland wharf, and as it was one man was killed and another badly hurt. The engine and tender of a train ran off an open switch and pitched through the bridge into the water alongside the embankment. The engineer, W. C. Brown, was drowned. Though violently shaken up, the occupants of the cars, with one exception, were not injured. An inquest was held on Brown's body, and the death verdict was accidental drowning.

NORDENSKJOLD has just left Berlin, expressing deep gratitude for the cordiality shown to him there. He dined with the Emperor and Empress on the day before his departure. The Professor will start northward upon his new Arctic expedition in 1882, from the month of the Lena. A new vessel is now being built for him in Norway, and Herr Silurikoff, a wealthy Russian, has offered to defray all the expenses of the expedition.

"Criminal Neglect of the Management."

At the conclusion of the coroner's inquest into the Imperial mine disaster of last week, the jurors of both Gold Hill and Virginia find that the "cable was defective by criminal neglect of the management of said Imperial mine." Here, for once at least, the blame is fixed upon some one. The testimony elicited at the inquest was very voluminous and interesting. The testimony of several witnesses condemned the cable, as it was shown to have been rusty, rotten and full of broken wires.

Louis Beckman, formerly ropeman at the Imperial mine, had examined the rope which broke in the Imperial shaft; saw a coil of it about 1,000 ft. long; examined it in company with Mr. Lewis; found the whole cable, almost from end to end, uncovered and rotten; it was not covered with tar, but with rust; to keep a cable from being eaten, it must be covered with tar; some of the wires were broken, the ends of the broken strands sticking out; the cable was unfit for use in any mine; the effect upon a cable falling down a shaft would be to smash it up; there was no tar on the cable from one end to the other; know it was the same cable by the peculiar make of it.

Harry Kyander, also a ropeman, testified that the rope did not look as if it had been well cared for; the rope was bad all through; would not have considered it prudent or safe to hoist or lower men or material with such a rope; if at work tarring the rope I could tell at a glance that it was defective; it was badly worn, strands were rotten through, and the tar had been washed off by the water in the shaft.

Richard Lewis had been mining two years; before that time worked on wire ropes in England one year; afterward was seven years at sea; had to look after wire ropes all the time; had examined the Imperial rope in company with Mr. Beckman; examined it thoroughly; it was defective from end to end; the wires were eaten and corroded, and the cable was covered with nothing but rust; considered it a highly unsafe cable to use in any mine; work at the Union shaft; every 30 or 40 days the cables there are changed.

H. H. Coote who has been ropeman at the Hale & Norcross for seven and a half years examined the rope, the better end of it very particularly; it was in a very bad condition, there were so many broken ends sticking out of the rope that it looked like a porcupine's back; these had been broken so long that many of them were worn thin as the point of a needle; the ends sticking out were from one to three inches long; considered the condition of the rope due to gross neglect of the superintendent and foreman; it should have been taken out of the shaft three months ago; the rope was worn out because it had been used and neglected too long; there was no tar on the rope, but the stuff that had been tar had turned to rust; in the case of a double or triple decker cage there should be a safety to each deck; when a rope breaks on the sheave the rope jumps off and bounds to the sheet iron flooring at the mouth of the shaft; if the safeties are in good condition they cannot fail to act; the Hale & Norcross ropes are examined every morning and tarred fresh every week; the Imperial water is very hard on ropes, but the Savage and Hale & Norcross water is as bad as any on the lode. The testimony of others was to the same effect, and although there was some counter testimony the jury found a verdict as above.

A WOMELSDORF, Berks Co., Pa., correspondent of the Reading (Pa.) Eagle, says that Mr. Samuel J. Tilden has offered \$1,500 for "the largest dog in America," which is now at that place. The dog is an Ulndog, and was bought in Germany last summer. He weighs 182 pounds, measures 6 ft. 9 inches from tip of nose to tip of tail, and is only 2 years old. He attracted Mr. Tilden's attention at a recent dog show.

PROF. ALEXANDER GRAHAM BELL, the inventor of the telephone, is described as a handsome and courtly man, still young, and the possessor of very black eyes. He is a Scotchman and was educated in Edinburgh. The Volta prize, just awarded to him as having made the best electrical discovery of the past 15 years, brings him the pleasant sum of \$10,000.

A WONDERFUL strike of free gold was made in the Ford & Mullen mine recently. Walter Ford, one of the owners, has become demented over his good fortune. His friends hope his madness will only be temporary.

THE Butte Miner (Mon.) says: 1,000,000 lbs. of mining and milling machinery and salt, belonging to the Alice company, are stored at the Utah and Northern terminus awaiting transportation.

THE Seattle Coal Company is making arrangements to increase the product of the mine from 600 to a 1,000 tons of coal per day.

PHENIX, Arizona, has three Sunday schools, six secret orders, a literary society and a library association—all flourishing.

THE mining prospects of New Mexico were never so good as now.

New Highways to Europe.

We have of late referred to matters pertaining to our outlet for produce to the European markets. As the production of our State, and of the Pacific coast generally, is now being largely increased and diversified, the subject of transportation routes becomes more and more important. The present facts that charters for grain to Liverpool are inordinately high and grain wretchedly cheap, are enough to awaken interest in any movement which promise in the future to multiply our outlets, and consequently increase the chance of shipping produce at a reasonable rate.

The advance of the Southern Pacific railway eastward through Arizona, the speedy connection with roads coming westward, and the promised off-shoot from the main line to New Orleans or Galveston, or some other point on the Gulf of Mexico, are all matters of general interest. The idea held by some that the new approach to the gulf will facilitate the shipment of California grain to England, by rail to the gulf and by ship across the Atlantic, offers a route in competition with ocean vessels around the Horn, which is certainly worthy of contemplation. It seems quite possible that a regular line of steamers from this gulf port to England would find abundant traffic in grain eastward and immigrants and merchandise westward to return a good profit to the ship owners. The new railways through the lower latitudes of the country will open up a vast domain to settlement and lead to the development of many mining and agricultural enterprises. If grain can be hauled and transported from this State to the gulf with anything like the facilities and cheapness with which it is taken from the new grain fields of the Northwest to the Atlantic ports, it will surely be a great factor in deciding how to get our massive grain crops to the consumers with much less outlay for transportation.

The map which we give on this page will be useful to students of our situation, with reference to our foreign markets. From the slightest comparison of distances it appears how expensive in point of distance and time is the present route around the continent of South America. Although the line is not drawn on the map, the reader can easily trace it from our grain fields to the Gulf of Mexico, and thence across the Atlantic. It will be seen that there is but a comparatively slight deviation from a straight line in the proposed route. If those who will have the management of the new line will but employ a generous and wise policy, they can make their highway of inestimable advantage in developing the country through which their line runs, and in enhancing the prosperity of the terminal State of California. The possible effect of the new route to the Gulf of Mexico was made the subject of remark by Hon. H. M. La Rue, President of the State Agricultural Society, in his annual address delivered last week at Sacramento. He said:

When the great wheat-growing valleys of California are connected with New Orleans by rail over the level grades of the southern route, the commercial lines to the final market for our wheat will be shortened by 10,000 miles. We will then have a constantly moving means of transportation at what I have reason to hope and believe will be reduced rates. The average inland tonnage on our grain now is about \$3.50 per ton. The average ocean tonnage to Liverpool is about \$13 per ton, aggregating \$16.50 per ton from the station or landing to the ultimate market. By the Southern Pacific railroad the pro rata of ocean to rail transportation will be reversed. The tonnage rate from New Orleans to Liverpool will not exceed \$5 per ton. Thus leaving \$11.50 per ton as the pro rata to rail transportation, and without increasing the aggregate rate. If expectation in this direction is well founded, the wheat product of California will possess higher advantages in the market than hitherto enjoyed. The completion of this southern route will introduce the now wanting element of competition with the long voyage around Cape Horn. It will also enable the shipper to receive quicker returns. Its further advantages will be found in the opening of markets for the orchard and dairy products of southern California, and it is within the range of possibilities to ship green fruit and fresh beef to the English market by that route. At this time fresh beef is shipped from points on the Missouri and Mississippi rivers by way of New Orleans to England, and the time from Sacramento by rail to the Crescent City is shorter than the time from Kansas City to the same point by water.

We also introduce this map to bring to the notice of those who have not already consulted their atlases, how notable a cut-off is the Isthmus canal, which is now being urged and is awakening much popular interest in this State. A glance at the geography of the enterprise, as shown upon this map, will do more to display its advantages than a host of statistics, although these are of great value in enforcing the importance of the object lesson in the map. The canal does not offer so speedy a relief as the proposed gulf route, but it should, nevertheless, be regarded as a positive need of our industrial growth, and must be in part the measure of the same. This view is being earnestly advocated by those who are best informed of our present and future productive capacity. A committee of the San Francisco Board of Trade has given the canal and its possibilities prolonged and diligent study. They issued a supplementary report last week, mainly to meet the errors of Eastern writers, who claim that the business of the canal would be small, etc. They give the following figures of the wheat trade of this State and Oregon this year:

A fair estimate of the wheat surplus of this State this year places it at 900,000 tons, which alone would require, allowing passage both ways, an aggregate shipping tonnage of 1,800,000 tons. An examination of the San Francisco Custom House statistics for 1879 shows that during that year there arrived from Australian ports vessels aggregating 125,450 tons. With this exception, our wheat tonnage would all have used a canal both ways, making 1,674,544 tons, an excess of nearly 50,000 tons over the

estimate given, on our wheat alone. Oregon has a surplus of about 200,000 tons of wheat this year, which, on the same basis as the California requirements are estimated, would add 375,000 tons more, making a total of above 2,000,000 tons for the export trade of California and Oregon alone. Our producers stand to-day face to face with this great fact. Oregon and California have only one fifth the necessary tonnage available for this purpose. This deficiency involves loss of time and expense; both ruinous to the producer. Were the Inter-Oceanic canal open, we could more easily obtain tonnage, and at the same time save, on a moderate estimate, some \$8,000,000 on this year's wheat crop alone.

And who will undertake to fix the limit of our production? The President of the California State Agricultural Society, in his annual address (Sept. 21, 1880), "estimates from reliable data this year's wheat crop at 1,600,000 tons." He deplored "the disadvantage of California farmers, in that their wheat has to go to Europe via Cape

isolated position, and rely upon long and expensive means of transportation. The world is the market for our diverse and rich productions, and barriers of distance and time must be swept away. The future of our favored territory is a grand subject for contemplation, but it should be cherished with no idle rapture. Every stirring thought should be father to an act, until the longed for results shall be realized.

KLEPTOMANIACS.—The London *World* made the startling discovery that kleptomania was common in fashionable society, and that thefts of jewelry, furs and wraps were frequent in the



GEOGRAPHICAL POSITION OF CALIFORNIA IN THE COMMERCE OF THE WORLD.

Horn, arriving there after the Atlantic and Black Sea ports have supplied the immediate demand," and declared the great problem of the future to be "transportation and market." He further states "that with the cultivation of available lands now unused, the possibility of the wheat production of California in the near future, are 3,000,000 tons per annum." If this be true of California, what may we expect from the development of Oregon and Washington Territory? With this light before us, how futile the idea that an inter-oceanic canal will lack tonnage to secure pecuniary success? Let us consider our rapidly-increasing wine, wool and other interests. Freed from the fetters of expensive transportation, our whole coast would feel new life.

We place all these facts prominently before our readers that their bearing upon our future may be discussed by all, and a general influence be exerted toward the promotion of enterprises which are of such signal importance. We cannot longer afford to occupy a comparatively

hall rooms and cloak rooms of the West End. Instances were given, names and places being suppressed. Truth followed in the same strain, and told how a light-fingered lady of title stole a sable cloak from a ducal mansion; also, how another lady of title lost a diamond necklace. It was said these conveyances of property could not have been inadvertent, seeing that expensive overcoats, costly lace shawls and other property were invariably replaced by shabby articles. In several cases the thieves were caught in the act, but, protesting error, were permitted to go, on restoring the plunder.

The Yellow Jacket pumps are running regularly and well, and are raising about 600,000 gallons of water per day.

Recovery of Sulphur in Silver Leaching.

From Aaron's Lixivation of Gold and Silver.

The quantity of sulphur required to precipitate silver is really only as 16 to 103, but great waste occurs in the usual practice from two causes. Firstly, there is always a certain quantity of base metal dissolved with the silver, which also takes its portion of sulphur from the calcium sulphide; and secondly, a large proportion of the sulphur is thrown down in a free state, which, in the usual course of proceeding, is totally wasted by being burned off in roasting the precipitate.

The reason of this precipitation of free sulphur is, that the precipitant is necessarily a pentasulphide, for the calcium monosulphide is insoluble, and the bisulphide is only soluble with heat (vide Regnault), so that we are reduced to the pentasulphide for useful effect. But in the precipitation of silver, we can only combine one atom of sulphur with one of silver, and as the atom of calcium in the pentasulphide takes the substance with which the atom of silver was combined, there remain four atoms of sulphur unoccupied and useless. Base metals act similarly, only arsenic and antimony being able to form sulphides containing five atoms of sulphur.

There are two ways to recover the free sulphur from the precipitate. The first consists in subjecting the mass to heat in a retort, and condensing the sublimed sulphur. The second method, original with myself, and which I much prefer, is to boil the unwashed precipitate in a vat, by a jet of steam, with water, and slaked lime carefully added. The free sulphur combines with the lime, producing at once the precipitating solution of calcium polysulphide, and much more quickly than the flowers of sulphur. Three-fourths or more of the sulphur is thus recovered for re-use. It is a question of cost whether it will pay to do it or not. In San Francisco sulphur is so cheap that there is not much economy when the trouble is considered, but in some places it would pay.

Mill Building.

There seems just now to be a mania for building quartz mills. We hear from all over the country of new mills, mostly for new mines. While it is pleasant to note so much apparent prosperity in the mining business, it is safe to think also that a good many more mills will be built than are really needed. It is often a most convenient way to "hoist" a stock—to order a mill.

In looking over our exchanges this week we were struck by the great number of mills in process of construction. In many instances they are nearly completed. In a great many more instances, the ore production is delayed till reduction works are finished. It is by no means the case, however, because a mining company builds a mill that its ore production will increase, or that it will ever have any more ore. A mill will often sell a mine when ore will not. It is not safe, therefore, to judge of the prosperity of a mine by the fact that a mill is being built.

COLORADO, NEW MEXICO AND ARIZONA.—We have received from A. L. Baercoft & Co., Rand, McNally & Co's. "Illustrated Guide to Colorado, New Mexico and Arizona," a work which also contains the general mining laws of the United States, Colorado, New Mexico and Arizona. There is also a map, showing every town, and routes to the different localities. This guide contains a description of country, soil, climate, timber, agricultural and mineral lands.

ROBERTSON PROCESS.—A New York telegram says: "Hale, the piano manufacturer, has, with his friends, bought a controlling interest in the Robertson Electric Ore Reduction Co. The new deal puts the process in the hands of a 'strong company' of capitalists." If this "strong company" can make a success of the process in any other way than by selling stock they will do more than was done in this State. It has been pretty thoroughly tried out here but with unsatisfactory results.

In the Sutor tunnel good progress is made now in both headers. Ventilation at the south header is good, but along the south lateral the heat is in some places excessive. A new plan for remedying this will now be tried. Buxes are going in to take air from the north branch to the south branch. The distance is great, but the chances for success are good. The work of carrying forward the drain of the main tunnel progresses well.

The New Yorkers have been bored so much with importunities to buy mining property, that not long ago, as the story runs, a notice was stuck up in the office of a leading hotel, bearing this inscription: "No mines taken in payment for board."

It is stated that a cracked church bell at Carson has been successfully repaired at the railroad shops by running melted metal into the crack of the bell, first placing it in an earth mold. Bell founders have held this feat to be impossible.

Making and Preserving Cider.

As the cider season is at hand, the following suggestions taken from an article in the *Scientific American* may be of use to some readers: A pure, sweet cider is only obtainable from clean, sound fruit, and the fruit should therefore be carefully examined and wiped before grinding.

In the press, use hair cloth or gunny in place of straw. As the cider runs from the press let it pass through a hair sieve into a large open vessel that will hold as much juice as can be expressed in one day. In one day, or sometimes less, the pomace will rise to the top, and in a short time grow very thick. When little white bubbles break through it, draw off the liquid through a very small spigot placed about three inches from the bottom, so that the lees may be left behind. The cider must be drawn off into very clean, sweet casks, preferably fresh liquor casks, and closely watched. The moment the white bubbles, before mentioned, are perceived rising at the bung-hole, rack it again. It is usually necessary to repeat this three times. Then fill up the cask with cider in every respect like that originally contained in it, add a tumbler of warm sweet-oil, and bung up tight. For very fine cider it is customary to add at this stage of the process about half a pound of glucose (starch sugar) or a smaller portion of white sugar. The cask should then be allowed to remain in a cool place until the cider has acquired the desired flavor.

In the meantime clean barrels for its reception should be prepared, as follows: Some clean strips of rags are dipped in melted sulphur, lighted and burned in the bung-hole, and the bung laid loosely on the end of the rag, so as to retain the sulphur vapor within the barrel. Then tie up half a pound of mustard seed in a coarse muslin bag, and put it in the barrel, fill the barrel with cider, and add about a quarter of a pound of isinglass or fine gelatine dissolved in hot water. This is the old-fashioned way, and will keep cider in the same condition as when it went into the barrel, if kept in a cool place, for a year.

Professional cider makers are now using calcium sulphite (sulphite of lime), instead of mustard and sulphur vapor. It is much more convenient and effectual. To use it, it is simply requisite to add one-eighth to one-quarter of an ounce of the sulphite to each gallon of cider in the cask, first mixing the powder in about a quart of the cider, then pouring it back into the cask and giving the latter a thorough shaking or rolling. After standing bunged several days to allow the sulphite to exert its full action it can be bottled off. The sulphite of lime (which should not be mistaken for the sulphate of lime) is a commercial article, costing about 40 cents a pound by the barrel. It will preserve the sweetness of the cider perfectly, but unless care is taken not to add too much of it, it will impart a slight sulphurous taste to the cider. The bottles and corks used should be perfectly clean, and the corks wired down.

A little cinnamon, wintergreen, or sassafras, etc., is often added to sweet cider in the bottle, together with a dram or so of bicarbonate of soda at the moment of driving the stopper. This helps to neutralize free acids, and renders the liquid effervescent when unstopped; but if used in excess, it may prejudicially affect the taste.

Extensive Iron Mine.

About three miles from Clipper Gap and six from Auburn in Placer county, are located the smelting works and mines of the California Iron Co. The mines were located about 10 years ago by Judge Meyers, G. W. Applegate and others, and sold a little over a year ago to Messrs. Irving M. Scott (of the Union Iron Works), A. P. Hoatsling, wholesale liquor dealer, and Egbert Jndson, Powder Co., all of San Francisco, who compose the California Iron Co. It is not a corporation. The company has bought 13,000 acres mostly on account of the timber. Extensive and substantial works are being erected, and will be completed about October 1st. The capacity will be 10,000 tons per annum. One hundred men are employed at the works and about 100 at the charcoal kilns and in the woods. Four thousand bushels of charcoal will be consumed each day.

Quite a town has already sprung up adjacent to the works. No name has as yet been given it, but it is built with a street 100 ft. wide and the houses are in regular line. When all is ready for smelting the company will have expended \$100,000. The ore is mostly of the magnetic kind and is almost free from sulphur and other foreign metals. It works 70% and makes superior iron.

The company expect to get a contract for casting the gas mains for the new San Francisco gas company. If this experiment proves a success there will be additional furnaces erected and a rolling mill is a thing spoken of in the future. All the machinery and furnaces are of the latest improvements and everything is substantially built. The various departments are under the supervision of able mechanics who have had much experience in Eastern iron works. A tramway is being built from the works to Clipper Gap station. The whole is under the charge of Mr. P. Fitzhugh.

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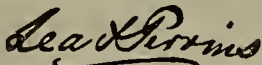
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THE MOST PERFECT TURBINE NOW IN USE

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Those improving water power should not fail to write us for New Prices, before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

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These Governors have long been known as the BEST STEAM GOVERNORS made, and as lately improved and perfected, they have no rival.

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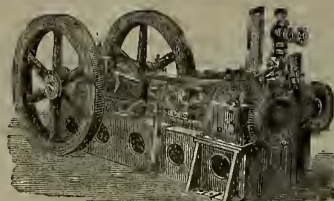
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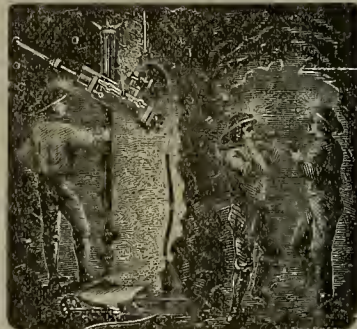


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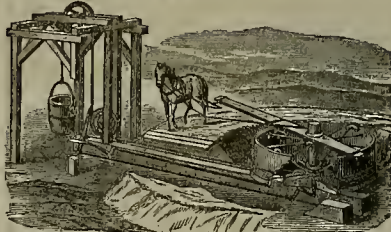
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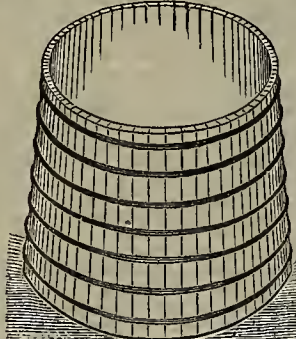


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120 Lithographic Diagrams. 1887.This work is unequalled by any other published, embrac-
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Pocket size, and very handy and convenient for miners.
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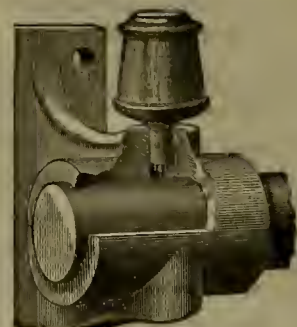
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LIGHTEST AND EASIEST RUNNING.

Cannot be upset by cramping or sudden turning.
Will pass over the roughest roads or car tracks without
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PACIFIC POWER CO.Room with steam power to let in the
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Stevenson street, near Market. Eleva-
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worth of which will last as long as from \$2 to \$10 worth
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animal fats do not main-
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destroy metal.The Albany Cylinder
Oil does not contain
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Member of the Jury on Wood-working Machinery at Paris
Exposition of 1878.This thorough work, impartially written in a clear, simple
and practical style, treats the saw technically, analyzing
its action and work, and describing, under the leading classes
of Reciprocating and Continuous Acting Saws, the various
kinds of large and small hand, ash, Mulay, jig, drag, circular,
cylinder and hand saws, as now and formerly used for
crosscutting, ripping, scrollcutting, and all other sawing
operations in wood, stone and metal, ice, ivory, etc., in this
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of manufacture, setting, sawing, running, filing, etc., tables
of gauges, log measurements from 10 to 24 feet, and from 12
to 48 inches, lists of all U. S. Patents on Saws from 1790 to
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624, 626 and 628 Market Street, Philadelphia
March 10 1880.**A Card from Architects.****The California Architect and
Building Review.**

Office, No. 240 Montgomery Street, San Francisco, Cal.

It is with pleasure that we publish the following from
prominent Architects in this city:Believing that a journal of this kind is a necessity on this
coast, and judging from what has appeared in the "Quarterly
Architectural Review," we are led to believe that the
CALIFORNIA ARCHITECT AND BUILDING REVIEW
will be worthy of generous support and encouragement. We
therefore pledge our cordial sympathies, personally, and hope
that the enterprise will receive a ready recognition and liberal
support from all Architects and Builders and the public gen-
erally. (Signed) David Farquharson, Wright & Sanders, S.
H. Williams, Thos. J. Welsh, P. Hueme, John Marquis, E.
McDougal & Son, Wm. Mosser, Wm. Curlett, Meeker &
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ing, Electrotyping and Stereotyp-
ing done at the office of the MINING
AND SCIENTIFIC PRESS, San Francisco, at favorable rates.

News in Brief.

THE epizootic has reached New York city. The crop prospects in India are improving. The Chileans again bombarded Callao August 31st.

GREAT damage is being done by floods in Texas.

HEAVY rains prevail in various portions of England.

THERE are several mild cases of varioloid at Stockton.

THE public debt was reduced \$12,000,000 in September.

SEVERAL turfmen are willing to give \$100,000 for Maud S.

EIGHT bodies have been recovered from the Hudson-river tunnel.

SOME of the Marquesans have revolted against the French authorities.

VENAGO, a large village in Switzerland, has been nearly destroyed by fire.

BELFAST is to be the next meeting place of the United Presbyterian Council.

MONSTER land meetings in Ireland. Parnell denounced the Liberal Government.

STRIKING workmen in Jagero, Russian Poland, have committed grave excesses.

ALL the fears in regard to the failure of crops are dispelled in most parts of India.

THE recent heavy forest fires which raged near Portland, Or., did great damage.

GALES and floods have caused great damage to the unharvested crops in Hamburg.

AN attempt to blow up the Czar's yacht Livadia at Glasgow has been frustrated.

THE Chinese in Peru are putting themselves under the protection of the British flag.

THE London and S. F. Bank has reduced its capital stock from \$600,000 to \$420,000.

A STEAMER which left Hamburg for New York Saturday brings \$1,000,000 in gold.

THE Oregon stage was robbed near the summit of Siskiyou mountain Thursday night.

THE Turkish Sultan and the Albanian chiefs reiterate their refusal to surrender Dulcigno.

THE miners at Corning, O., have compelled the saloon keepers to close their places of business.

ABOUT 400 Chinese and white men have begun work on the railroad grade near Spokane, W. T.

THE track of the Southern Pacific railroad has reached the New Mexico line—140 miles east of Tucson.

JOHN ADAMS shot and killed Isaac Wilson Sunday night, Sept. 26th, in Knox township, Napa county.

A POWERFUL party in Norway are agitating separation from Sweden, and the establishment of a republic.

THE Cuban insurgent chief, Carrillo, with his remaining followers, have surrendered to the Spanish authorities.

THE revenue of the Government the past year amounted to \$334,000,000—over \$1,000,000 for each working day.

A NAVAL review on a more liberal scale than that of last year will take place in Hampton roads about October 15th.

DURING the ten years ended June 30, 1880, immigrants to the number of 2,812,177 arrived at ports of the United States.

LORD MOUNTMORRIS, a landowner on had terms with his tenants, has been found murdered near Ballinacree, Ireland.

THE fastest time ever made by a pacer on a half-mile track was accomplished at Omaha this week by Mattie Hunter—2:16.

THE Circuit Court of Oregon has decided against the law prohibiting the employment of Chinese on the streets of Portland.

THE Burmese tyrant has arrested his mother and sister, with thirty other persons. It is rumored that executions have recommenced.

U. S. GRANT, Commander-in-Chief, has called a convention of the Union veteran soldiers and sailors, to meet at Indianapolis, October 7th.

THE Supreme Court has decided that there is to be no Municipal election in San Francisco this year, the present officials holding over.

JAMES G. FAIR, a member of the well-known "Bonanza firm," has announced his willingness to be a candidate for United States Senator from Nevada.

THREE women were poisoned at Wilkesbarre, Pa., not long ago by using cornmeal in which arsenic had been placed for the purpose of destroying rats.

PAYMASTER NELSON, of the United States Army, has been arrested and taken to New York for Kansas City for trial by court-martial on charge of embezzlement.

IT is stated that the French cable company has accepted the terms of the rival companies' agreement, subject to ratifications by French and American governments.

THE defeat of Ayoub Khan, according to reports from Simla, caused Ameer Abdurrahman Khan the greatest satisfaction, and has had the most quieting effect on the country.

THE upper portion of Plymouth Rock, which has laid for 46 years in front of Pilgrim Hall, at Plymouth, has been returned unostentatiously to its original place beside the Rock itself.

MR. RUSKIN gives some sensible advice with regard to the proper and unstrained education of children. He says: Make your children happy in their youth; let distinction come to them, if it will, after well-spent and well-remembered years; but let them now break and eat the bread of heaven with gladness and eagerness of heart, and send portions to them for whom nothing is prepared; and so heaven send you its grace before meat, and after it.

Bay Horse District.

A correspondent of the Salt Lake Tribune, writing from Challis, Idaho, says: A ride of eight miles in a southwesterly direction from this place reaches the mining district known as Bay Horse. In making the journey, we travel up a good mountain road until a point high up is reached, when, taking a trail, we climb to the summit of a high divide, from which the view of the surrounding country is vast and full of grandeur. From this dizzy height, the Salmon river and its course is observable for nearly 100 miles.

The first mine reached is that called Bull of the Woods, owned by Riley & Sullivan, who are taking out ore and sacking it for shipment to the new smelter. This mine, as all others in the district, is in elate formation, but has a foot-wall of porphyry. The ledge lies at an angle of 45°, dipping west, and the ore assays very high, the average running up to from \$600 to \$800 per ton, and smelts easily. The elevation of the present workings is 9,500 ft. above sea level.

A short distance from this is located the most noted mine of this locality, called the Ram's Horn. The ledge, varying in width from 3 to 12 ft., lies at an angle of 30°, and cuts through the hill of slate, and has been traced and located for several miles south, extending into the district known as Poverty Flat. The present work on the Ram's Horn consists of one tunnel 355 ft., and another 150 ft. Another tunnel of 80 ft. has been run in on another ledge that seems to be an offshoot of the main lode. The ore is chloride carrying 16% lead, and when sampled the first grade runs 500 ounces and the second grade 140, and carries some iron and copper. The ore is sent down the steep and rugged sides by means of a 700-ft. tramway of T rails, operating the cars by means of iron ropes and a middle turn out. This property is considered one of the best in the entire district, and is owned by Col. M. E. Lindeay, A. J. McNah, G. S. Fisher and E. W. Jones. Mining is being prosecuted with a force of 45 men, and ore is shipped to the smelter at Bay Horse, some three miles down the gulch.

Some distance up the Bay Horse creek, some small lakes add much to the beauty of the scenery, and a visit to the largest one proved it to be apparently bottomless and its waters abounding in fine trout. Going down the creek the town of Bay Horse is reached, where it stands nestled in a narrow valley, hemmed in by high and precipitous mountains. A saw mill and smelter are the attractions to induce settlers here.

The Bay Horse smelter just started is known and operated by the Omaha Smelting and Refining Co. of Omaha, Nebraska, and is capable of handling thirty tons of ore per day. The officers of the association are: C. W. Mead, President; E. W. Nash, Superintendent; A. J. Cook, manager of the smelter and G. P. Monton, manager of the mines. The Omaha works paid last year nearly \$7,000,000 for ores, a large portion of which went from Utah and Idaho, and their getting a foothold here with a smelter of such capacity and with chances of enlargement, will do very much toward developing this new and important district.

Half a mile from the smelter we entered the Beardsley mine, owned by Robert Beardsley & Co. The lode is in limestone, with a slate talc hanging wall. The vein varies in thickness from three to twelve feet, and runs high in silver in selected specimens, while the entire lode goes above 60 ounces in silver and 25% lead. The mine is valued at \$200,000, and is certainly favorably located.

So far the town of Bay Horse is but of little interest, except as a new mining camp where, within the past two months mill machinery and a dozen houses have been built, and people have congregated to the number of about seventy-five, all intent on making money. A good wagon road connects that road with Challis.

A THRIVING MINING CAMP.—Rich discoveries continue to be made in El Dorado canyon, San Bernardino county. A correspondent of a San Bernardino paper, writing from that camp, says: We have visitors who desire to hold our mines, but as long as we are taking out rich ore and plenty more in sight, we want to see the cash if we dispose of our claims. We struck an 18-inch ledge of ore that assays \$416 per ton. A contract has been let on the Silver Eagle to run a tunnel 50 ft. Work has been commenced on the January mine. The ledge is from 6 to 40 ft. wide. The ore so far taken from it assays from \$100 to \$300 per ton. Men are arriving here every day, and I believe there will be a camp of 500 men here in less than two months. Mr. Philib, the Raymond & Ely Superintendent, has returned from California. He has bonded a mine for \$10,000 and will commence work on it immediately. Weaver is still sinking on the Lone Star mine, and taking out ore that will assay \$1,000. The streak is only eight inches wide. Nicholls, Howell and Varneke are at work on their claim, and are taking out horn silver ore that so far has assayed \$5,860 per ton.

SILVER CITY (New Mexico) is looking forward to a prosperous season this fall and winter. Bremen's mill is running steadily on rich ores. The Legal Tender mill will soon be completed, and will commence on a large pile of ore now on the dump. The Cosette mining company is now repairing the old Lyon mill and will start up as soon as the repairs are completed.

METALS.

(WHOLESALE.)

WEDNESDAY M., Sept. 29, 1880.

IRON.—		
American Pig, soft, ton.....	32 00	@ 33 00
Scotch Pig, ton.....	26 00	@ 27 00
American White Pig, ton.....	26 00	@ 27 00
Oregon Pig, ton.....	—	@ —
Refined Bar.....	44 00	@ 45 00
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ —
Nail.....	8 1/2	@ 9 1/2
Norway, according to thickness.....	—	@ —
STEEL.—		
English Cast, D.....	16 1/2	@ 18
Black Diamond, ordinary sizes.....	13 1/2	@ 15
Drill.....	9 1/2	@ 10
Flat Bar.....	—	@ —
Plow Steel.....	9 1/2	@ 10
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 20
Sheathing, Tinned 14x48.....	—	@ 42
Nails.....	—	@ —
Bolts.....	38 1/2	@ 42
Old.....	—	@ —
Br.....	—	@ 22
Precipitate, 100 fine.....	18 1/2	@ 19 1/2
LEAD.—		
Pig.....	42 1/2	@ 5
Sheet.....	—	@ —
Pipe.....	—	@ —
Pipe, Soft.....	—	@ —
Shot, Discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Buck.....	—	@ 2 30
Chilled.....	—	@ 2 50
TIN PLATES.—		
10x14 O Coal.....	—	@ 10 50
10x14 O Coal.....	10 00	@ 10 50
Bacon Tin.....	—	@ 25 00
Australian.....	—	@ 20 00
I. C. Coal, Roofing 14x20.....	—	@ 10 00
20x22.....	21 50	@ 22 00
ZINC.—		
By the Cast.....	—	@ 10
Zinc Sheet 7x3 ft. 7 to 10 lb. less than cast.....	10 1/2	@ 11
NAILS.—		
Assorted sizes.....	4 00	@ 4 75

LEATHER.

(WHOLESALE.)

WEDNESDAY, M., Sept. 29, 1880.

Sole Leather, heavy, lb.....	30 1/2	@ 32
Light.....	25 1/2	@ 28
Jodot, 8 to 10 Kil, doz.....	36 00	@ 48 00
11 to 13 Kil.....	50 00	@ 65 00
14 to 16 Kil.....	55 00	@ 72 00
Second Choice, 11 to 13 Kil.....	40 00	@ 65 00
Stano Ulmo, Females, 12 to 13 Kil.....	52 00	@ 68 00
14 to 15 Kil.....	61 00	@ 75 00
16 to 17 Kil.....	67 00	@ 80 00
Shoon, 18 Kil.....	67 00	@ 84 00
20 Kil.....	—	@ 85 00
24 Kil.....	70 00	@ 93 00
Kips, French, lb.....	1 00	@ 1 37
Cal, doz.....	—	@ 1 37
French Sheep, all colors.....	12 00	@ 15 00
Eastern Calf for Backs, lb.....	1 00	@ 1 25
Sheep Roams for Topping, all colors, doz.....	9 00	@ 10 00
For Linings.....	8 50	@ 10 00
Cal, Russian Sheep, lb.....	9 00	@ 5 50
Boot Legs, French Calf, pair.....	—	@ 4 50
Good French Calf.....	—	@ 4 00
Best Jodot Calf.....	4 75	@ 5 25
Leather, Harness, D.....	—	@ 5 00
Fair Bridle, doz.....	45 00	@ 50 00
Skinning, D.....	33 1/2	@ 37 1/2
Welt, doz.....	30 00	@ 38 00
Buff, ft.....	17 1/2	@ 20
Wax Side.....	19 1/2	@ 20

LUMBER.

WEDNESDAY M., Sept. 29, 1880.

CARGO PRICES OF REDWOOD.	ROUGH, M.	RETAIL PRICE.
Rough, M.....	14	18 00
Surface.....	24 00	15 00
Rustic.....	24 00	16 00
do, No. 2.....	24 00	22 50
do, No. 1.....	24 00	20 50
do, No. 2.....	17 00	25 00
do, No. 1.....	28 00	17 00
Refuse.....	20 00	25 00
Half-inch Siding.....	23 00	18 00
Refuse.....	18 00	18 00
Half-inch Surfaced.....	24 00	2 00
Refuse.....	18 00	2 00
Half-inch Siding.....	18 00	2 00
Pickets, Rough.....	11 00	18 00
Rough, Pointed.....	12 50	18 00
Fancy, Pointed.....	13 00	18 00
Shingles.....	1 75	3 50

Some fine sunny offices (next to the PRESS office), to rent (at very reasonable rates), by Dewey & Co., at 202 Sansome street, corner of Pine.

Quinine and Arsenic

Form the basis of many of the Agree Remedies in the market, and are the last resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. ATRE'S AGUE CURE is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent and certain, and no injury can result from its use. Besides being a positive cure for Fever and ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive as well as cure, of all complaints peculiar to malarious marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

FOR SALE BY ALL DEALERS

Judicious Advertising.

We find in the Joliet Sun the following sensible remarks in regard to advertising: "Last Sunday's St. Louis Globe-Democrat contained fifty-three columns of advertisements. Most of this space was taken by old, well-established houses—the very ones that might have some grounds for saying: 'Oh, everybody knows we are here. The New York Herald of the Sunday previous contained 105 columns of advertisements, for which its receipts were \$11,000. One of the leading and best known dry goods houses of that city took four columns. When successful business men of vast experience and so well known that their names have become household words, keep up their advertising from year to year at enormous expense, they must certainly believe that judicious advertising pays."

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & Co.'s MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the PACIFIC RURAL PRESS, which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

J. G. COLMERN is requested to report to this office. He went to Humboldt County, Cal., about May 4th, 1880. His Agency for this paper has been revoked for good and sufficient reasons. Mr. O. is a heavy set man, of dark complexion, weighing some 175 pounds, or more.

CHEW JACKSON'S BEST SWEST Navy Tobacco.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Napa Consolidated Quicksilver Mining Co.

SAN FRANCISCO, SEPTEMBER 21, 1880.

At a meeting of the Board or Directors of the above named Company, held this day, a dividend (No. 13) of Ten (10) Cents per share was declared, payable on WEDNESDAY, the 22d day of September, 1880, at the office of the Company, Room 16, Academy Building, No. 350 Pine street, San Francisco, California.

WM. W. FARRISH, Secretary.

ANNUAL MEETING.

The regular annual meeting of the stockholders of the Spaulding Gold and Silver Mining Company will be held at the office of the Company, No. 117 Battery street, San Francisco, California, on TUESDAY, the Twelfth (12) day of October, 1880, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may properly come before the meeting. Transfer books will close on Friday, the Eighth (8) day of October, at 12 o'clock M., until after the meeting.

JOHN HEIN, Secretary, Office—No. 117 Battery street, San Francisco, Cal.

Tehattucup Silver and Gold Mining Co.—

Location of principal place of business, San Francisco, Cal. Location of works, El Dorado Canyon, Lincoln County, Nevada.

NOTICE—There is delinquent upon the following described stock, on account of assessment (No. 7), levied on the 24th day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Avery, Benj P.....	161	100	\$ 100 00
Barrow, Henry D.....	230	50	50 00
Cutler, Sam'l M.....	209	108	108 00
Corbett, Miles S.....	190	30	30 00
Cole, Lewis N.....	135	100	100 00
Cole, Lewis N.....	136	50	50 00
Cole, Lewis N.....	137	50	50 00
Cole, Lewis N.....	138	50	50 00
Cole, Lewis N.....	139	50	50 00
Cole, Lewis N.....	140	50	50 00
Cole, Lewis N.....	141	50	50 00
Cole, Lewis N.....	142	50	50 00
Cole, Lewis N.....	143	50	50 00
Cole, Lewis N.....	144	50	50 00
Cole, Lewis N.....	145	50	50 00
Cole, Lewis N.....	146	25	25 00
Childs, O W.....	127	100	100 00
Caley, Wm.....	22	200	200 00
Caley, Wm.....	221	100	100 00

Names	No. of Certificate.	No. Shares	Amt.
Childes, M. W.	17	100	100 00
Dockweller, Henry	97	30	30 00
Dockweller, M.	15	100	100 00
Foster, David	203	54	54 00
Foster, David	237	200	200 00
Dockweller, Henry	231	120	120 00
Griffith, Sarah A.	247	30	30 00
Hobbs, H. H.	240	1000	1000 00
Hobbs, H. H.	241	1000	1000 00
Hobbs, H. H.	249	500	500 00
Hayes, R. T.	236	500	500 00
Hinber, Wm H.	213	50	50 00
Hoyt, Mrs Irene	169	100	100 00
Hoyt, Albert	165	50	50 00
Hoyt, Albert	183	100	100 00
Hoyt, Mary E.	123	70	70 00
Hoyt, Mary E.	123	50	50 00
Hoyt, Mary E.	159	50	50 00
Hoyt, Mary E.	225	925	925 00
Hoyt, Mary E.	228	500	500 00
Hall, John H.	208	72	72 00
McGue, Robert K.	207	54	54 00
McKeeby, L. C.	248	300	300 00
Nelson, James	88	200	200 00
Pray, August	250	500	500 00
Rubottom, Wm W.	153	50	50 00
Thomas, Chas W.	91	100	100 00
Tryon, E. B.	251	200	200 00
Urmiston, David	204	18	18 00
Vineyard, J. R.	23	250	250 00
Vineyard, J. R.	24	250	250 00
Vineyard, J. R.	25	250	250 00
Vineyard, J. R.	26	250	250 00
Whitecomb, A. C.	62	100	100 00
Whitecomb, A. C.	63	137 1/2	137 50
Whitecomb, A. C.	173	2 1/2	2 50
Workman, Nancy	18	275	275 00

And in accordance with law, and order of the Board of Trustees, made on the 24th day of August, 1880, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, No. 237 First St., San Francisco, Cal., on Wednesday, the 20th day of October, 1880, at the hour of one o'clock, p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

C. F. MOULTHROP, Secretary.

Office—No. 237 First St., San Francisco, Cal.

Gover Mining and Milling Company—
Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 43), levied on the Eleventh day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name	No. of Certificate.	No. Shares	Amt.
Ellis, H. C.	206	250	\$ 50 00
Hulme, Eliza J.	245	500	100 00
James, James	65	63	12 00
James, Frederick	331	62	12 40
McAfee, Wm.	200	500	100 00
McAfee, Wm.	201	500	100 00
McAfee, Wm.	202	100	33 00
Miller, W. J., Trustee	243	1750	350 00
Miller, Eliza J.	391	500	100 00
Morgan, W. S., Trustee	336	1000	200 00
Morgan, W. S., Trustee	337	1000	200 00
Morgan, W. S., Trustee	338	2000	400 00
Oates, Wm.	67	100	20 00
Oates, John	68	125	25 00
Ream, Charles	72	50	10 00
Ream, Charles	73	50	10 00
Ream, Charles	74	50	10 00
Sanborn, F. G.	335	250	50 00
Skinner, Maria	334	250	50 00

And in accordance with law, and an order of the Board of Directors, made on the Eleventh day of August, 1880, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, No. 402 Front street, room 3, San Francisco, Cal., on Monday, the Eleventh day of October, 1880, at the hour of one o'clock p. m. of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

W. O. WILSON, Secretary.

Office—402 Front street, Room 3, San Francisco, Cal.

22-INCH IRON PIPE.

Parties having Second-Hand SHEET IRON PIPE for sale, 22 inches in diameter or larger, made from iron Nos. 10 to 14, in fair condition, are requested to send word to the MILTON MININO and WATER CO., French Corral Nevada Co., Cal.

H. C. PERKINS, Supt.

A. J. PLATE & CO.,

Guns, Pistols, Sporting Goods

MILITARY GOODS AND REGALIA,

HAVE REMOVED

From No. 510 Sacramento and No. 325 Montgomery Street, to

Nos. 418 and 420 Market Street.

GUINEAN'S UNIVERSAL REFRIGERATOR.

It will keep Provisions of all kinds, Meat, Game, Butter, Fruits, Etc., for a longer time and in better condition than any other. All sizes, suitable for family use, Restaurants or Hotels.

HOBBY & SMITH, Agents.,

317 J STREET, - - - Sacramento City.

PERMANENT BEER TAP.

This Tap can be used in any keg. Or be regulated to draw Steam or Flat Beer, and is self-locking when the key is taken out.

Brewers' Rights, State Rights or County Rights for sale.

FETTERLY & DUTTON,

Yolo, Yolo County, Cal.

RECENTLY PUBLISHED.

WORKSHOP RECEIPTS

For the use of manufacturers, mechanics and scientific amateurs. By ERNEST SPON, Crown, Svo., Illustrated. Price, \$2.00. Send for Catalogue of books for practical engineers.

E. & F. N. Spon, 446 Broome St., N. Y.

The MECHANICS' INSTITUTE

(Of the City of San Francisco.)



First Premiums—Official.

Awarded at Fifteenth Industrial Exhibition—1880.

Gold Medal FOR THE BEST PHOTOGRAPHS

AWARDED TO

Taber

AT MECHANICS' FAIR, 1880.

PHOTOGRAPHIC PARLORS,

Opposite Grand and Palace Hotels, 27 Elevator—3 Montgomery street, over Hibernia Bank, San Francisco.

SPECIAL NOTICE.—To Mining and Insurance Companies, Surveyors and Architects.—We beg leave to inform you that we have just received the very latest improved instruments from Europe, especially adapted for Photographing Maps, Drawings of Machinery, Shafts, Buildings, etc., which we furnish at lowest rates. Would be pleased to have you favor us with an order.

THE CALIFORNIA

Furniture Manufacturing Comp'y.

Cold Medal.

BEST GENERAL DISPLAY OF FURNITURE

SILVER MEDAL—Assortment of Chairs.

SILVER MEDAL—Set of Parlor Furniture.

SILVER MEDAL—Set of Dining Room Furniture.

SILVER MEDAL—Set of Bed Room Furniture.

BRONZE MEDAL—Easy Chair.

The only large and complete Stock of Furnitures on the Coast. Latest Styles at lowest prices.

220, 222, 224 & 226 BUSH STREET, S. F.

GAS CONSUMERS ASSOCIATION OF SAN FRANCISCO.

First Premium.

Automatic Gas Regulator.

202 BUSH ST., Near Sansome.

C. BROWN & SON., First Premium.

WINTHROP RANGES.

Plated and Iron Granite Ware.

The WINTHROP PORTABLE RANGE with all Modern Improvements. The most popular range on the Coast.

18 Dupont Street, San Francisco.

PARKE & LACY, Cold Medal.

DOUBLE HOISTING ENGINES and REELS.

SILVER MEDAL—Hoisting Engine and Boiler Combined.

SILVER MEDAL—Compound Centrifugal Pump.

SILVER MEDAL—Vertical Engine.

SILVER MEDAL—Babcock Chemical Fire Engines.

BRONZE MEDAL—Boiler Injector.

BRONZE MEDAL—Steam Engine Governor.

21 & 23 FREMONT STREET,

SAN FRANCISCO.

PACIFIC LAMP & REFLECTOR FACTORY.

First Premium

AGAIN AWARDED AT

INDUSTRIAL EXHIBITION, 1880.

For Patent Locomotives and Mining Head Light.
For Patent Street Lamps to Burn Coal Oil Without Chimney, Naptha and Gas.

For Patent Sign Lamps. Also, Robert Mill Sectional Globe Lamps for Hotels and Restaurants.

For Patent Central Reflector Lamps for Mills, Factories, Cars, Etc.

For Patent Silver Corrugated Glass Reflectors and Sun Lights for Churches, Halls, Etc.

Squares Reversible Coach Lamps; Dash Board and Brake Lamps

E. BOESCH, 583 and 585 Mission St.,

SAN FRANCISCO, CAL.

W. H. OHMEN,

First Premium.

Vertical Boiler and Engine Combined.

Upright and Horizontal Engines and Boilers a Specialty.

ENGINE AND MACHINE WORKS,

W. H. OHMEN, Proprietor.

109 & 111 Beale Street, near Mission, S. F.

B. E. HENRIKSEN, First Premium

For Best Safety Clutch for Elevators.

Thurlow Block.

126 KEARNY STREET, San Francisco.

JONATHAN KITTREDGE. Cold Medal.

FIRE AND BURGLAR PROOF SAFES

Silver Medal.

BEST BURGLAR PROOF LOCKS.

All kinds of Forging and Machine Work; Prison Cells and Bridge Work; Wrought Iron Girders and Beams; Fire and Burglar Proof Safes; Bank Vaults and Bank Locks; Wrought Iron Doors and Shutters; all kinds of House and Smith Work. Estimates given for all kinds of machinery.

PHENIX IRON WORKS,

18 & 20 Fremont Street, near Market, S. F.

M. B. DODGE,

First Premium.

STONE BREAKER AND ORE CRUSHER.

The Dodge Rock Breaker CHALLENGES THE WORLD to produce as good and cheap a machine. Rock Breaker and Cornish Rolls Combined in one Machine. Pulverizers to granulate Ores for Roasting, chloriding, leaching & concentrating.

M. B. DODGE, 143 Fremont Street, S. F.

MORRIS'

PNEUMATIC MANUFACTURING CO.

First Premium.

PNEUMATIC

Railway Signals and Annunciators.

BRONZE DOOR LOCKS AND HINGES.

Manufactory:—No. 1045 Market Street, S. F.

BETTS SPRING CO., Prize Medal.

BEST DISPLAY OF

Carriage, Buggy and Car Springs.

Manufacturers of all kinds of Locomotive, Car, Carriage and Wagon Springs.

Orders promptly attended to, and all Springs Warranted.
218 Fremont St., bet. Howard & Folsom.

J. M. CURRAGH.

First Premium.

Granular Effervescent Salts.

413 BUSH ST., Near Kearny.

(Up Stairs.) San Francisco.

S. P. TAYLOR & CO., First Premium.

FOR PRINTING AND WRAPPING PAPER.

MANUFACTURED AT THE

Pioneer and South Coast Mills.

414 & 416 CLAY ST., San Francisco.

THE FIRST PRIZE,

A Silver Medal.

AWARDED TO

HERRMANN,

THE HATTER,

For the BEST HATS, the LARGEST VARIETY and the NICEST DISPLAY. Send for Illustrated Catalogue.

C. HERRMANN, 336 Kearny St., near Pine

Davis Vertical Feed Sewing Machine VICTORIOUS AGAIN!!

FIRST PREMIUM Gold Medal at Mechanics' Institute Fair, 1880.

FIRST PREMIUM for work done on the spot, Silver Medal, 1880.

FIRST PREMIUM Oregon State Fair, 1880.

FIVE FIRST PREMIUMS Central New York Fairs, 1880.

FIRST PREMIUM and the only machine placed in First-Class at Australian International Exhibition, 1879-80.

THE NEW DAVIS SEWING MACHINE,

Being a complete departure from the ordinary style of sewing machines, possessing all the advantages of such ordinary machines, and in addition an increased range of work, with the greatest simplicity of construction, and reduction of number of working parts, we consider it to be entitled to the first place in the awards.

Agency—130 POST STREET, San Francisco.

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom,

SAN FRANCISCO.

SACRAMENTO BOILER WORKS,

214 & 216 BEALE St. (rear of Ætina Foundry),

J. V. HALL,

PRACTICAL BOILER MAKER.

Marine, Stationary and Portable Boilers, Smoke Stacks
Hydraulic Pipe, Oil or Water Tanks, Ore and
Water Buckets, Gasometers, Girders,
Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK,

Repairing promptly attended to at the lowest
possible terms.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, between N and O Streets,
SACRAMENTO, CAL.

PHELPS

MANUFACTURING COMPANY,

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Manufacture Iron Castings and Machinery
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Steam Engines, Flour, Quartz and Mining Machinery.
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The best ever invented; can be applied to any Engine
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Crushing Rolls, Clarifiers, Vacuum Pans, Air Pumps,
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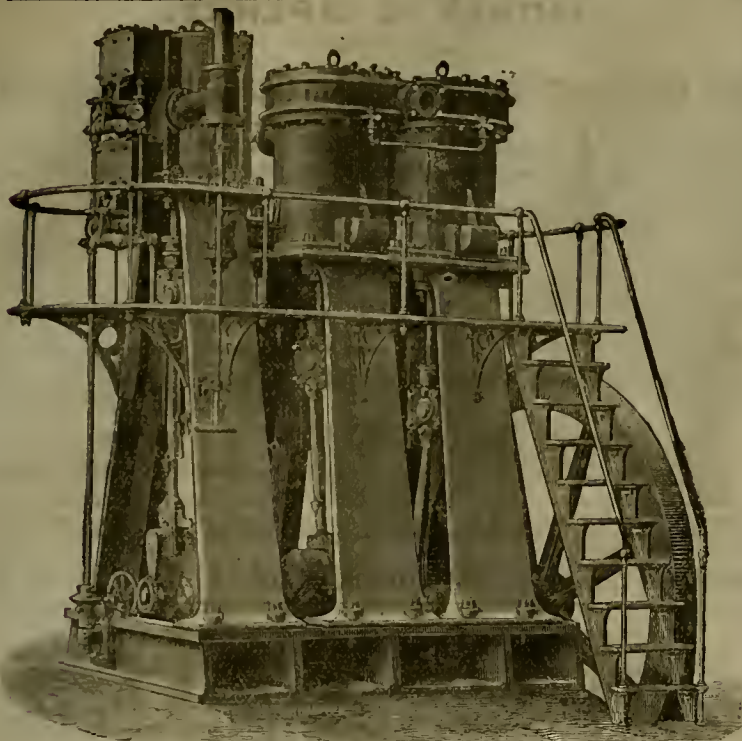
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

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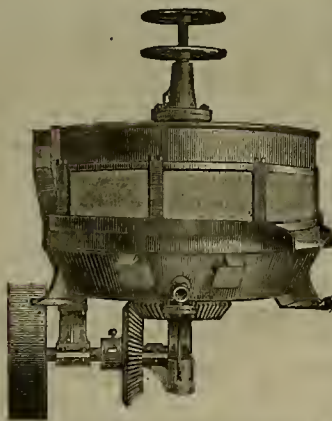
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This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all; and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is simple, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

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It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

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MACHINERY!

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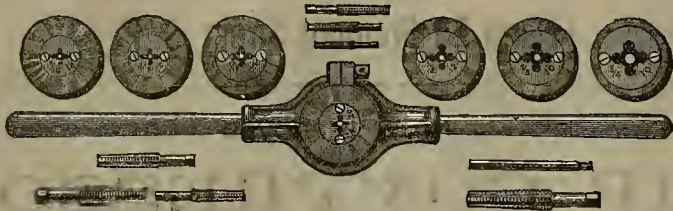
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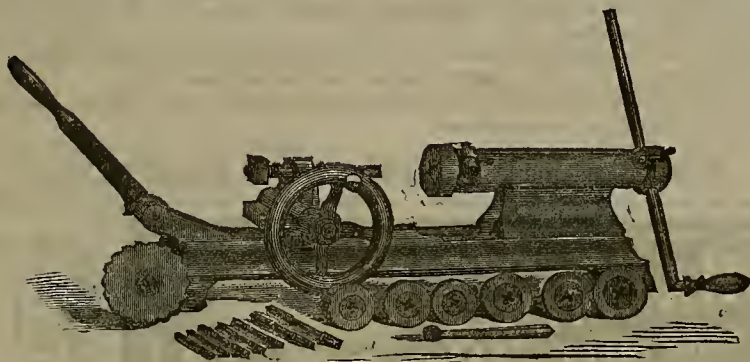
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WITH TAPS, DIES AND COLLETS COMPLETE.

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C, " 26 " " 7 " " " " $\frac{1}{2}$ to 1 "
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ESPECIALLY FOR CROOKED WORK!

Made to be bolted to the Bench or Table. Fitted with seven sizes, from $\frac{1}{4}$ to $\frac{3}{4}$ inch. Usual assortment, $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ inch.

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MINERS TESTIFY THAT IT IS FREE FROM OBJECTIONABLE FUMES.

We call the attention of all desiring such a Powder to our various grades, which we are prepared to sell at LOWEST RATES.

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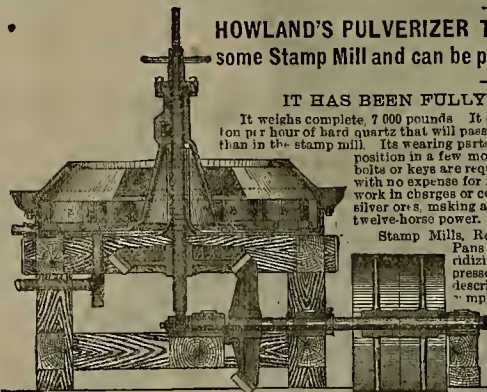
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IT HAS BEEN FULLY PROVED AND TESTED.

It weighs complete, 7,000 pounds. It costs \$1,250 ready for the belt. Will crush one ton per hour of hard quartz that will pass through a 40-mesh screen. The wear is less than in the stamp mill. Its wearing parts are plain castings and can be dropped into position in a few moments, as shown by the letters A, B and C, no bolts or keys are required; it can be set upon the floor of a mill with no expense for foundations, and can be used to crush and work in charges or continuous. It will amalgamate either gold or silver ores, making a simple, cheap and effective mill, it requires twelve-horse power.

Stamp Mills, Rock Breakers, Crushing Rolls, Amalgamating Pans and Separators for Gold and Silver Ores, Chlorinating Furnaces, Retorts, Rock Drills, Air Compressors, Steel Shoes and Dies for Stamps, and every description of Mine and Mill Supplies, Iron Work complete for Wood Frames, also

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WROUGHT IRON FRAME

FOR STAMP MILLS.

Great saving in time and money over the Wood Frame. It is made complete with Wrought Iron Frame ready to put upon the foundation. We construct Mills with Stamps weighing from 350 to 900 pounds for Gold and Silver Ores, Wet or Dry Crushing Mortars.

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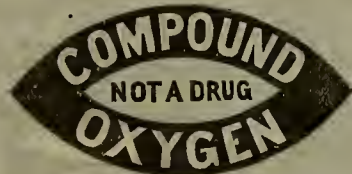
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IS NOW USED IN ALL LARGE HYDRAULIC CLAIMS.

It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. Triple Force Caps and all Grades of Fuse.

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For Consumption, Asthma, Bronchitis, Dyspepsia, Catarrh, Headache, Debility, Rheumatism, Neuralgia and all Chronic and Nervous Disorders. It is taken

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And acts directly upon the great nervous and organic centers, and cures by a natural process of revitalization

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Will Please take notice that we have taken the sole agency for the KNOWLES' STEAM PUMP, for the Pacific Coast States and Territories, and keep a full stock of Pumps and Duplicate Parts on hand at all times.

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SAN FRANCISCO, SATURDAY, OCTOBER 9, 1880.

VOLUME XLI
Number 15.

The Kropff Ice Machine.

Machines for the production of artificial cold can be divided into two general classes; first, those in which cold is obtained by the expansion of compressed gases; second, those in which cold is obtained by the evaporation of fluid. The machines of the second class employ the evaporation of fluids, such as ammonia, ether, methylic ether, sulphuric acid, anhydrous sulphurous oxide and other chemical substances. These machines are worked either upon the principle of compression or of absorption, the

supply the cellars with immense quantities of pure, cold and dry air, furnishing either all at the same time, or each singly, according to the capacity of the machine. The machine supplies thereby cold for every process requiring cold, whether it be ice for storage in the ice-house or for use in the fermenting tubs, or water for cooling the wort, or air for keeping the fermenting and store-cellars at the required low temperature. By his system the ice machine sends cold to all parts of a brewery; so that it really becomes the heart of the same.

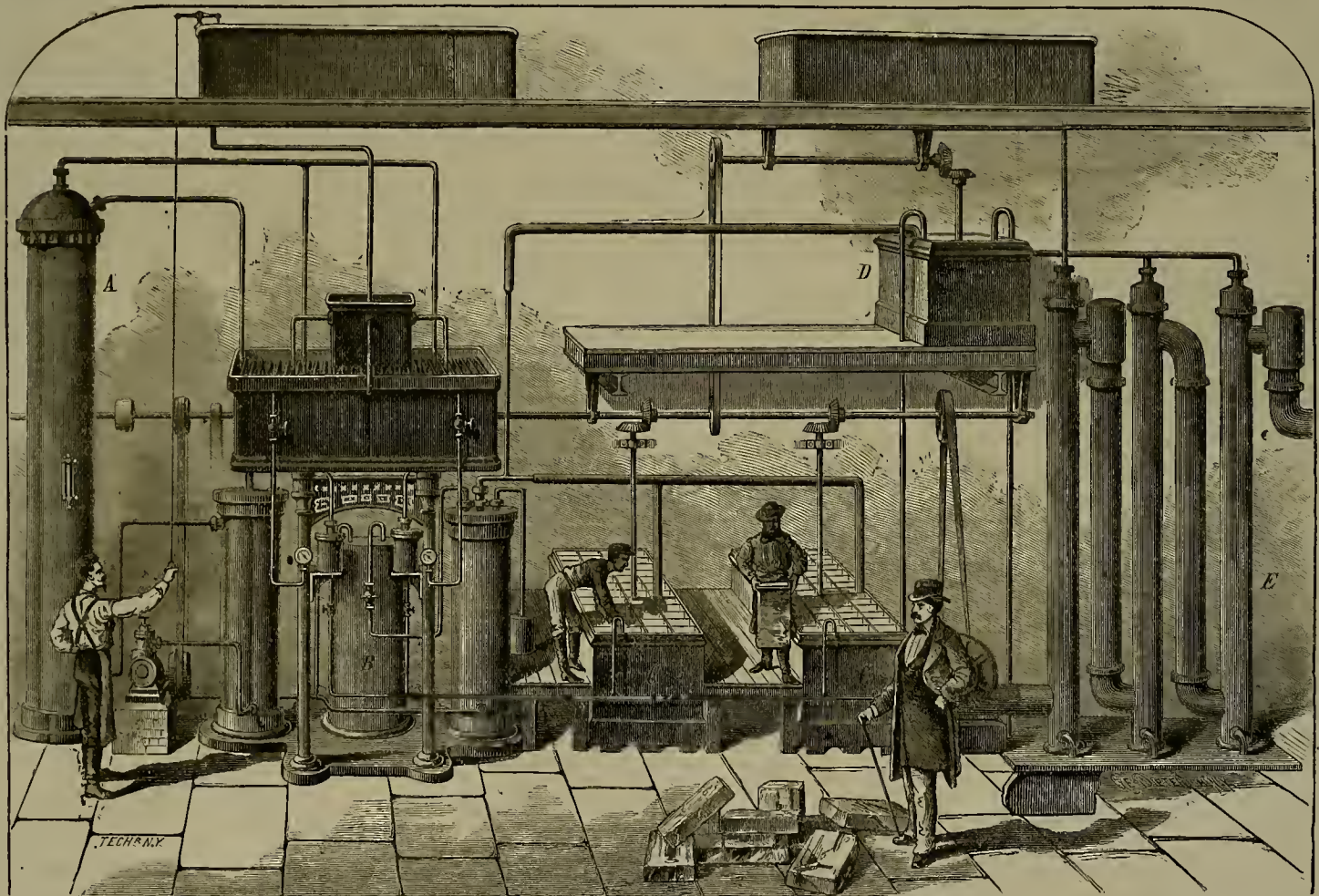
In the Kropff ammonia absorption machine the ammonia vapors are separated in the boiler by the action of the steam, condensed in the

ammonia boiler; B, the condenser and absorber; C, C, the ice making tanks; D, the cold-water tank; and E, the air-cooler.

If cold air is desired for the cellars, the same is cooled to a low temperature in the patent air-cooler by cold water or brine, refrigerated in the cold-water or brine tank. The air-cooler consists of a series of cylinders, through which the air is successively forced, it working its way through sprays of ice water or brine. The sprays are formed by the passage of the cooling liquid through perforated plates at the top of each cylinder. Connecting tubes pass from the upper part of one cylinder to the lower part of the next, and conduct thereby the air from one

\$5,500, produces 200 pounds of ice per hour, requiring one horse-power to operate it.

The machines give pure, dry and cold air for cellars. They are manufactured in Nordhausen, Germany. Paul Goepel, Tyron Row, New York, is agent for the United States. The machines are in use in many of the large European breweries. In this country there is one at George Ringler & Co.'s, East Ninety-Second St., New York, and one at Weher & Schilling's, Louisville, Ky. The machine illustrated is specially adapted for brewers' use, but they are equally well adapted for other purposes. Either, for producing ice for mines, or for cooling air to be forced into mines, they may be



THE KROPFF AMMONIA ICE MACHINE AND AIR COOLER.

former system requiring considerable power, to wit: steam and coal, while the latter system requires less power, but a considerable quantity of water for cooling. Owing to the small running expenses and reliable working of the absorption machines, they have given satisfaction where introduced. Amongst all ice machines which employ chemicals, the greatest number now in use employ ammonia as the refrigerating agent, which has the advantage that it can be more cheaply and easily obtained than any other.

Prominent among the manufacturers of ice machines has been Oscar Kropff, of Nordhausen, in Germany, who has made for himself a world-wide reputation for substantial and durable work, and more especially for the manner in which he has adapted his machine to all the different forms of cold required in the brewing processes. His machine is an ammonia machine, built on the principle of absorption, but with all the improvements, which an experience of 20 years has suggested. His machine enables the brewer not only to make ice, but also to cool large bodies of water to a low temperature and

cooling coils into liquid form, the liquid ammonia being collected in small vessels, from which it is conveyed to the ice-producers in which the water is frozen into slabs of oblong shape. The low temperature is produced by the quick evaporation of the liquid ammonia in the coils of the ice-producers, whereby heat is abstracted from the surroundings and thereby intense cold produced. The ammonia vapors are returned to the absorber, where they are brought into contact with the water from the boiler, which is poor in ammonia. This water absorbs the vapors and is then pumped back again into the boiler to be used over and over again in the same manner.

In the engraving given herewith this machine is shown in connection with the ice-producers, cold-water tank and air-cooling apparatus. The liquid ammonia is conducted to the ice-producers and cold-water tank, so as to make ice and cold water, which latter is conducted off, to be used for cooling the wort in the wort-coolers, or the beer in the fermenting tubs. A pump returns the water to the tank to be again refrigerated for use. In the engraving, A represents the

cylinder to the other. A continuous supply of pure, perfectly dry and fresh air of very low temperature is thus furnished, by which the different processes in brewing are advantageously effected.

By the use of the air cooler the cellars can be kept uniformly and without difficulty at the required low temperature. The air is distributed in the cellars by flues or tubes, which pass along the center of the cellars, and which are provided with openings, closed by slides, so as to keep the supply of air within perfect control. This air cooler has been recently patented in the United States (May 18th, 1880.) It can also be run with ice water, and in this form is an economical means of cooling the cellars of such breweries which do not like to go to the expense of an ice machine. An air cooler alone, with refrigerating tank, fan and pump, but without the ice machine, costs from \$1,200 to \$4,500, according to size. The ice machine itself costs from \$5,500 to \$20,000. The \$1,200 air cooler requires a quarter of a horse-power to run it, and will cool 25,000 cubic ft. to 32° F. per hour. The smallest sized ice machine, which costs

used. There are five sizes of the air cooler, the largest costing \$4,500, and being capable of cooling 650,000 cubic ft. of air per hour to a temperature of 32° F. The \$20,000 ice machine produces a ton of ice per hour. Mr. Goepel will furnish estimates and give more detailed information on application.

MANAGERS OF CORPORATIONS.—In the case of McKiernan vs. Leuzen, the Supreme Court has decided that when a corporation is endowed by its charter with the capacity to enter into any obligation or contract, essential for its purposes or for the transaction of its ordinary affairs, and its business is transacted by a general managing agent, who is suffered to exercise general authority in respect to its business, the corporation is bound by his acts, within the scope of the powers assumed by him, in the same manner as if expressly granted. In respect to the management of its business, a general managing agent and superintendent is the representative of the corporation, and may do in the transaction of its ordinary affairs, what the corporation itself could do within the scope of its powers

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EWS

Mineral King, Tulare County.

New Ledges—New Fossils.

EDITORS PRESS:—The crucial test for the Mineral King mining district has now been fully made. The vital question for success in extracting the silver and gold that certainly exist here in large quantities in the numerous metallic veins of these vast igneous, aqueous and metamorphic rock masses, is solved practically and, no doubt, conclusively. That question, as already indicated, is:

Do the Mineral King Mines Produce Free Milling Ores?

Mr. Fowler's Empire mill has decided this for the district, by an experimental run of not quite three days' full time, more than six weeks since. The whole working of the machinery was satisfactory, showing that the preparations were thorough. In all, the stamps ran only between two and three days. After this short run a careful clean-up was made, to learn results and to decide whether it will pay to run the mill without previous treatment of the ore by roasting or other process. Much amalgam was obtained. Little or no quicksilver had been wasted. When this amalgam was reduced to bullion, with the greatest care and skill, the result obtained was a bar of bullion 10½ inches long, 5 inches deep and between 4 and 5 inches wide—the first born, as a full-sized silver bullion brick, to which Mineral King, or, in fact, Tulare county, has given birth. At the time of that experiment your correspondent, in company with R. B. Harper, superintendent, John Dunn, chief engineer, and Robert Steingger, assayer, saw this bar weighed by S. Scribner, amalgamator. It was 86½ lbs., which, at 14.58 oz. per lb. for Troy weight, gave 1,261.17 oz. Its value in money has never been made public, but, as some lead remained in spite of the careful process of reduction followed, there was probably less than \$1,000 silver in the bar.

Your correspondent has, however, been reliably informed that only about 38% of the silver in the ore was extracted by this milling process alone. Mr. Harper, the Superintendent, was at once convinced that the ore must be roasted before milling. Mr. Fowler made his arrangements accordingly, and the time since then has been occupied in preparing the fire-proof and other brick; and in erecting the roaster. Mr. Harper has been aided in this important work, recently, by C. A. Luckhardt, the noted mining engineer. Another experimental run has lately been made, and Mr. Luckhardt is reported as being well satisfied with the result. Meanwhile, the recent developments in the mine from the extension of the winze, are full of encouragements. Large bodies of rich ore are reported to have been discovered. These matters indicate (and we trust without any farther disappointing delay) the successful development at last of the Empire mine. May it and neighboring mines yet have a long era of prosperity.

In this connection it may be of service to mines requiring roasters like that now built for the Empire, or smelting works, as most Mineral King ledges require, to record a suggestion given me by an experienced miner recently. It is to

Use Soapstone Instead of Fire Brick—

A good quality that does not scale; lasts in copper smelting works six months, where common fire-brick will last only three or four weeks. It can be easily sawn of any size required. Where it can be used, there is certainly economy in it. Now, as there are masses of the very finest quality of smooth greenish soapstone in the Mineral King district, it may be used to great advantage there for future smelting works.

A New Mining Region.

To which no attention has yet been called in your columns, is as follows: About 40 miles south of Miner's peak, and on the same ridge, is a sharp granite peak, five or six miles east of the sources of Deer creek and White river. On the map it is called "Smidday peak." It is likely to become noted for its gold and silver mines in the future. Within the last year ledges rich in free gold and sulphurets have been located around its base, and much "float," rich in free gold, has been discovered southeast of it, towards the Kern. On one vein a tunnel has been run in 90 ft. Assays range from \$24 per ton into the hundreds. It is deemed likely that good placer diggings exist east of Smidday peak on a small tributary of the Kern. The district is in the southern edge of Tulare county, and can be best reached from Greenville by road and trail in a distance of 25 or 30 miles.

No information has yet been given your readers of a promising ledge in Deer canyon, three or four miles northwest of the town of Mineral King. It is

The Double Standard.

Your correspondent visited it while there, by trail through Farewell gap, in company with Stephen Barton, former editor of the *Iron Age*, Visalia, and W. B. Wallace, who own it jointly with F. J. Walker, present editor of the *Delta*. The ledge is several feet wide, has been prospected some distance by shaft and drift, and its ores assay from \$3 to \$500 per ton.

By Mr. Barton and Dr. S. G. Gsorge my attention was called to some

Interesting Fossil Impressions

On shales and slates found in Lake canyon. Dr. George and I visited their locality while on a trip to a promising ledge of his near Crystal lake at the head of the canyon, and which he calls "Silver Wreath mine." These fossiliferous rocks, the only ones yet found in all that district, are on a steep declivity among some stunted junipers on the left of the trail, a short distance beyond the Mogul ledge. Large masses of these shales and slates are found standing on edge in almost perpendicular positions. The impressions appear to be those of fucoids, bivalve shells and small crustaceans. They certainly bear a close resemblance to some of the primitive vegetable and animal forms of the silurian age. I sent some to Prof. Joseph Le Conte for his ripe and decisive opinion, and Dr. George sent some to Mr. Hanks, State Mineralogist.

Prof. Le Conte decides that they belong to the triassic or jurassic—most likely the former. He informs me that similar ones have been sent to University Museum from Plumas county. They are some of the most primitive fossils yet found in California, and though they do not go back to the paleozoic or oldest fossil-bearing era, they belong to the mesozoic, or next oldest.

J. W. A. W.

Hanford, Sept. 25th.

Auriferous Gravel.

A Theory of Its Formation.

EDITORS PRESS:—As I have examined and studied in the rocks, and more particularly the gravel deposits of California for many years, I have eventually arrived at certain conclusions, which may be novel to some:

I have noticed in the PRESS from time to time the various ideas and theories, as set forth by different writers, according to their fancy, imagination, or power and ability to look back into the past, and examine the works of nature, as they were going on millions of years ago, the same as they are to-day.

Many errors and false ideas have been presented to the public, and particularly to the miners, about the origin and production of the auriferous gravel deposits of California. These have often led the miner, and more particularly the prospector, astray. In other words, the miner has not received that guidance and assistance the State should have rendered him years ago.

There was a time when the Sierra Nevada was but a low mountain range, and the waves of the Pacific beat against its foothills, which probably were not extending southwest and northeast as now; but rather north-northwest and south-southeast, parallel with the main mountain range, with deep and parallel depressions between.

The drainage of the waters from the land carried with it a large amount of sediment into the valleys of the sea. The result of this sedimentary formation was the secondary or metamorphic rock. In course of time, the molding, modeling and remodeling of the face of this secondary formation became land interspersed with large dykes of trap, which was born in the sea, on lines parallel to the main mountain range. During those changes, the face of the earth had been subjected at times to great convulsions; many fissures were formed in its crust, some small, and some of great magnitude, extending through the secondary and down into the primitive rocks. Minerals in solution, with silica predominating, formed and crystallized in those fissures till they were full. These are now known as quartz veins, or lodes.

As land in places acquired an altitude above the sea level, rivers took their inception from the rains that fell upon the land, and became extensive according to the dimensions of the land, and ran in various channels from the summit of the Sierra to the deep Sacramento and San Joaquin depressions, which were then covered by the sea. These rivers were deepened and enlarged by time, according to the elevation of the country. In the early period, the land attained but a moderate altitude, which in all cases governs the depth of the river channels, so that the river beds of the ancient channels were only about from 400 to 800 ft. lower than the surrounding country. By degrees, and in time, as all the different streams, with their tributaries, had formed their channels, the Coast range, with all the land adjacent thereto on the east, made its appearance above these, and the waters receded. By the slow and gradual upheaval, all the mountain streams from the Sierra Nevada and westward, began to lose grade, and a deluvial deposit, formed from boulders and gravel mixed with more or less gold from the breaking down of quartz veins, began to gather along the bottom of the channels, as the stream was no longer rapid enough to carry it away, particularly so on the soft, slaty bedrock of the auriferous belts. Much of this material was the result of erections by tributary streams, of whatever size, yet they contributed by crossing and wearing down by slow degrees the various auriferous belts, which are three in number in the central part of the State. Time and ages were passing on gradually as the coast was rising; so the inland rivers kept filling until the gravel deposit attained a depth of from 200 to 500 ft. The streams were

then flat and wide, and meandering from side to side; by times, undermining the low river banks, and dropping the then growing trees into the stream, of which we now find large quantities in the form of fossil wood, mostly in the upper strata of gravel from 50 ft. to 100 ft. in depth. This fossil wood affords positive proof that a fine country and magnificent forest existed on the Pacific slope ages ago.

We have abundant evidence all over the central part of California of the presence of these ancient river systems, which are now so conspicuous and valuable, one of which covers, to a large extent, the counties of El Dorado, Placer, Nevada, Sierra and Yuba. These river systems cutting for ages by slow degrees down through auriferous belts of rock, which are in many places literally streaked with quartz veins, must have separated an immense amount of gold from this quartz veins, in which it was formed, and carried the greater part of it into the Sacramento valley or basin. This theory applies equally well to other drainage basins, which exist from El Dorado county and south, as far as the upper San Joaquin, and others further north emptied into the upper Sacramento.

There is also reason to believe that during the first geological epoch of this State, the formation of these rivers was greatly facilitated by glacial action. During the early part of this period, one of those streams in its course westward, cut through a very extensive trap-rock belt at Dutch Flat. The channel became deep and narrow comparatively. The river had but little gravel in it at the time, when all of a sudden, a great mass of rock appears to have slid from the south bank into this stream, and we find that a great portion of this slide—millions of tons—was carried westward, down stream, three or four miles in a body, without being washed or rounded by the action of the water. I take this as evidence of glacial action.

Some time after this great slide, the glacial marks disappear, and the rivers having lost most of their grade, still kept on filling up 200 or 300 ft. more, with small uniform gravel, varied by little sand streaks, and the face of the country became nearly level, the streams meandering from side to side in the valleys, which were gradually being formed.

During all this time there was no lava on the west of the Sierras; but gradually a new scene appeared on the face of this slope. The earth shook and trembled by reason of internal convulsions; great fissures opened, large quantities of ashes issued therefrom, which flowed down from the volcanic Sierras into the valleys below. The stream ran so level, that a large amount of ashes was deposited over the whole length and width, from 100 to 200 ft. in depth. After this first deposit of ashes came the heavier and more solid earthy material, generally known as lava, which issued from time to time in immense quantities from numerous volcanoes which came into existence near and above the line of the Sierras. It was doubtless the action of these volcanoes which entirely obliterated the ancient river system of the central and northern part of California. This great volcanic eruption kept on for a long period of time, flowing lava and ashes in different places and at different times, till it covered nearly the whole slope, from the summit to the present valleys, to a depth of from 200 to 1,000 ft. During this period there was no fixed or permanent bed for any stream. All streams were liable to be filled with lava at any time, and the running waters had to form new channels repeatedly. Eventually, when the disturbing elements became exhausted and quiet prevailed, the new and present river system began to form, and the present rivers took their inception from the natural downward tendency of the water.

From that time till now, the country has changed greatly in altitude, and attained, generally, a much greater altitude than it formerly had, which is clearly shown by numerous faults in the bedrock, and also by the disturbances, in various places, of deluvial and volcanic strata of horizontal formations. One particular proof of upheaval which exists in the Sierra Nevada, I cannot refrain from pointing out. It is to be found in the form of an immense gravel, or boulder and deluvial deposit on the summit of the Sierra Nevada, three or four miles westward from Webber lake. All this deluvium is formed from basaltic rock at an altitude of about 8,000 ft. This is proof of a large stream, once flowing westward through that section of country, and draining a large portion of the interior basin in the earlier part of the modern river system. From this great and irregular upheaval we have two notable results: First, the waters running with great velocity have cut down all those mountain streams into the form of deep gorges or canyons. Secondly, it has destroyed the regularity of grade in all the ancient river channels, and this result appears to be a great stumbling block in the way of tracing out those ancient streams. Nevertheless, the streams did run from the whole upper part of El Dorado county, northwest and through Placer and part of Nevada, and down into the valley in Yuba county, receiving many tributaries on the way, from the east, northeast and north. Many of these streams can be found and traced, where the ancient channels have been cut through by the modern streams and canyons. And these same cutting and wearing down processes have contributed or furnished most of the gold which we find in the modern river beds, partly from the ancient gravel beds and partly from wearing down the auriferous belts of rocks and quartz veins to a depth of from 1,200 to 1,500 ft. lower than the ancient streams ran. But in the early period of the modern streams,

they contained no auriferous deposits because they ran in lava, and it not being gold-bearing, there was no gold mixed with the gravel in those streams till they had cut down and through the ancient river channels, which had previously become obliterated by the flow of lava. It is of the greatest importance to the prospector and miner to notice and understand this fact, because in the early gravel deposits formed from lava material, he will never find gold enough to pay for extracting. But after they had cut down through the ancient gravel channels, then still deeper down through the bedrock and gold-bearing quartz veins, they became rich in gold and hence have paid so well to work. L.

McMillen District.

This camp is "built upon a rock," upon several of them in fact, assaying enough to keep town lots at a premium. Mines are located in it and around it, and its principal business street is included in the boundaries of a claim. Its people too assay 'way up in hospitality, and the stranger will find himself well treated, and when in less favored spots will retain admiring recollections of rich ledges and pleasant memories of McMillen good fellowship. The camp is 21 miles from Globe, a little east of north, in a canyon winding north for a mile and then turning to the east. Including Stonewall mill and camp, there are between 45 and 50 buildings of adobe and frame. The principal business houses are Killner & Co., whose affairs here are in charge of Mr. J. W. Ranson, a thorough business man; Mr. Nicholls, who is one of the first merchants in the place, and Mr. Strong, in whose establishment is located the Postoffice. Mr. F. C. Minshull has one of the most complete news depots in the country, well supplied with periodicals from every part of the world. He also carries a good stock of liquors, stationery, notions, drugs, etc. Messrs. Martin, Hoffman & J. N. King represent the saloon business, and a good butcher shop, barber and laundry are flourishing. The Merchants' Exchange and Stanley House are the two hotels.

Mining is distinctively the industry and life of the camp, employees from mines and mills being the best customers. To mention half the good claims in this vicinity would require an extra edition, and we will confine ourselves to only a few of the most prominent, which a hurried trip enabled us to visit. The Stonewall is of course the one engaging public attention most at present, both on account of extensive development and wonderful richness. This claim has justly a more than territorial reputation, and the steadily increasing value of its ore as depth is attained is proof of the permanency of our ledges. At a depth of 480 ft. a large body of water was encountered pouring in in each volume that half the 24 hours was consumed in pumping it. New and improved hoisting works are now on the ground being erected, and the mill will hereafter be run regularly, this abundant supply of water removing the only obstacle they have heretofore encountered in making full time.

The Lee mine, joining the Stonewall on the southwest, has a shaft 80 ft. in depth, and crosscut of 84 ft., showing ledge to be 68 ft. in width. There are several drifts along the footwall and two winzes, one on the foot wall and one near hanging wall. Work will be resumed soon.

The Mayflower lies northwest of the Stonewall, and shows little more than assessment work. A ton of ore from this claim, worked at Silver City three years ago, returned \$3,000.

The 4-40, an extension of the Florence, shows a ledge of four ft. in width, running parallel with the Stonewall and Lee. This property has been leased to different parties, but never thoroughly developed.

The Antler and Washington are owned by James Wilson, of New York. The former has a shaft 150 ft. deep, and drifts are now being run. The ledge shows four ft. in width, carrying exceedingly rich ore. Steam hoisting works are in operation on the mine.

The second north extension of Stonewall is the Washington, with two shafts, 40 and 50 ft., exposing a well-defined ledge of high-grade ore. Hoisting works are required here before work can be prosecuted.

The Democrat, located by Flournoy and Aiken, and now owned by a New York company, is coming to the front. The working shaft is down 70 ft. on a two and a half ft. vein of rich chloride and horn silver. There are four veins running parallel and dipping north, on which are eight cuts and prospect shafts. Ore from the bottom of working shaft assays \$150, and \$20,000 was taken out by first owners, just where it was richest and could be most easily secured. The present working is the first systematic development that has been attempted, and Mr. Charles D. Spain, Superintendent, is going ahead rapidly, and in a business-like manner. He is evidently the right man in the right place.

There is very little "hurrah" and no fuse and feather about McMillen. It is going on in its own quiet and prosperous way, and is not only supporting, but the influence of its bullion shipments and traffic is felt all over the county. —Globe Chronicle.

The mines around Shauntie, Utah, are said to be looking well. The prospects for a boom in that district are bright, and the men who reside there and own claims that they have 'staid by' for 10 to 15 years expect to realize handsomely from ore shipments this fall.

MECHANICAL PROGRESS.

A Queer Locomotive.

In our last issue we gave some account, under the above head, of a locomotive with its driving wheels on top—or rather with two sets of driving wheels, one vertically over the other. This locomotive is now in process of construction at the Grant Locomotive Works, in Patterson, New Jersey. We have since met with the following additional particulars in regard to this singularly constructed machine, which presents the first really radical departure in locomotive building since the days of Stephenson. We copy from the *New York Times*:

As is generally known, all devices hitherto employed to gain speed have in some way depended upon an increase in the size of the driving wheels, or of the number of strokes of the piston, to both of which methods there are well-known practical limits and objections. This invention is intended to utilize the familiar principle in mechanics, that when a large wheel drives a small one there is a gain in speed and a loss in power. Speed being the object in this case the power is, therefore, transmitted from the piston to the track by a combination (on each side of the engine) of three wheels, one upper and two lower. The upper wheel is driven by the piston, the two lower wheels revolve around a common axle, but their diameters are unequal. The larger is five and one-half ft. in diameter (as also is the upper driving wheel), and the smaller one is four ft. The upper driving wheel, carrying much of the engine's weight, rests and acts on the smaller of the lower ones, and the larger of the lower wheels, which must turn with it, both being fixed to the same axle, transmits the power to the track. The theory is that, without increasing the oscillations of the piston above those now common, the revolutions of the larger of the lower driving wheels, and the speed of the engine will be increased in the ratio of the diameter of the larger wheel to the smaller, that is, in the proportion of five and one-half to four. There are also incidental advantages, such as great steadiness, arising from the fact that it is possible to carry the boiler very low; and there is an ingenious device for increasing at will the adhesion of the upper and lower driving-wheels (upon which the power of the engine depends) by forcing their treads together by means of levers operated by compressed air. The system of driving-wheels is, however, the head and front of the invention, which we have endeavored to describe without, in justice to the inventor, prejudging it.

REMARKABLE WELDING.—A correspondent of the *Blacksmith and Wheelwright* discourses as follows about welding:—"A great deal has been said about the welding of cast steel, and a great many different receipts for making welding preparations given, but for successful welding in my opinion there is nothing so good as the cherry heat welding compound. I have been a practical blacksmith and tool maker for over 40 years, and have used every receipt that I have seen printed and others that have not been printed, and I have yet to find its equal. If any there are who can say to the contrary, I would respectfully say that they do not know how to use it. For the information of such, I desire to state that although it is called cherry heat welding compound and you can weld with it at a very low heat, still I would recommend a borax heat or a little higher, and am satisfied that all blacksmiths using it in this way will be surprised at the results. Some wonderful things have been done with this compound. I will mention one which was exhibited at the American Institute fair, and was pronounced by the *Iron Age*, *Scientific American*, and other papers here and in Europe a wonderful piece of welding. A bar of Bessemer steel, $2\frac{1}{4}$ inches was bent over on itself, some compound put between and welded. The second weld was a piece of cast steel, $2\frac{1}{4}$ inches, welded back of the first weld on the same bar. The third weld on the same bar was a piece of blister steel the same thickness and width. Next a piece of iron same size, and the fifth weld was a piece of cast iron of the same size, $2\frac{1}{4}$ inches. The edge of the bar was then ground and polished and the welds were perfect. Many other remarkable things could be said about the above compound, but I will not encroach on your valuable space further."

STEEL joists are being made at a few factories in England and on the continent, but certain difficulties attend the rolling, which as yet prevents their manufacture on a large scale. Steel plates for bridges also are not as yet used to the extent anticipated, and the long span bridges in which their utility is undoubted, do not often occur. In boiler plates the considerable advantages which steel offers are being availed of, and for flanging and other treatment, where high quality Yorkshire iron was formerly used exclusively, steel is, says Messrs. Matheson & Grant in their half-yearly engineering trade report, found to be considerably cheaper, especially for plates of large dimensions.

Iron-Clad Steel—A New Manufacture.

The Norway iron works at their rolling mills in South Boston have been working a product of iron and steel lately which is somewhat of a curiosity to iron craftsmen. It is called, after working, iron-clad steel, and, although the process was invented and patented some years ago, it has never yet come into general use. It has always been considered rather difficult to work iron and steel together, to any great extent, on account of the difference between the two metals. Although steel and iron readily unite when they are brought to a proper degree of heat, yet it has always been found rather difficult to properly heat long bars of iron and steel so that they would become firmly welded together under the pressure of rollers. This invention of iron-clad steel, it is claimed, has surmounted the difficulty. The metals are united by a curious process before the rolling commences. A box is made of pig iron or muck bars, with sides, ends, top and bottom complete. Into this box the steel is put, the box is closed, the whole mass is brought to a high degree of heat, and the process of working begins. The iron box inclosing the steel, now in form of a solid mass with the iron and steel united, is worked into the form of a bar and is ready for rolling. This bar two or three inches square, it is claimed, costs three cents a pound. The process of rolling begins, and the steel with the iron outside of it can be rolled down into any size of rod or bar which may be desired. The most curious feature is that the iron and steel keep their places relatively, the iron still outside of the steel, no matter how much it may be worked.

Like the candy maker's plastic sugar when he puts in a lump of different color and draws and molds the two together, each color keeps its place and the stick of candy is produced with a red center; so the iron keeps its place outside of the steel in the process of rolling, and the steel is produced with a coating of iron around it varying in thickness according to the relative proportions of iron and steel that were used in making and rolling the box at first. As stated above, the process is not a new invention, but from the fact that the invention has lain comparatively idle for some time, it is probable that people interested in the working of iron and steel may have forgotten it, even if ever aware of its existence. The process of manufacture is curious, and several advantages are claimed over the ordinary process of uniting iron and steel by welding. It is claimed that the iron box prevents the decarbonizing of the steel in the process of heating and working. The superintendent of the rolling mills also says that the steel, which fuses at a lower degree of temperature than the iron around it, often bursts out of the iron enclosure in a molten state. It is proposed to put the iron-clad steel to various uses. It is already being made into horse shoes and tested, and it is thought that it may be very useful and available for other purposes. The article is controlled by a patent, and the rolling mills at South Boston produce only a prescribed amount for the company controlling the invention.—*Boston Herald*.

The Effect of High Speed of Engines Upon Condensation of Steam.

At the recent meeting of the Master Mechanics' Association, Mr. C. A. Smith, of St. Louis, reported the results of a series of experiments made to ascertain the temperature of steam cylinders during the working of the engine at varying speeds. The apparatus employed in these experiments consisted of a silver tube six inches long, 5-16 inches in diameter outside, and 1-32 inch thick, this tube being closed at one end, and having passed through it a rod connected by a cam and tooth gear to the index of an ordinary pressure gauge, the arrangement being such that the expansion and contraction of the silver tube moved the index of the gauge, and so indicated the temperature. The necessary graduations were obtained by the comparison of the instrument with a good thermometer. In using the apparatus it was applied to the cylinder, so that the exterior of the silver tube was exposed to the steam in the cylinder, and when thus applied to the cylinder of an engine working slowly, the index of the instrument showed during each stroke nearly the whole range of temperature to be expected from the variation in the pressure of the steam. At higher speeds, however, the range of action of the index became less. Thus on the 24th of April last the apparatus was applied to a locomotive hauling a light passenger train, the steam being throttled except at the highest speed. The experiments were continued through a run of 33 miles, and it was found that whereas, when the engine was making but 50 revolutions per minute, the instrument indicated a change of temperature of 120° during each stroke; at 100 revolutions per minute the variation dropped to 60°; at 200 revolutions to 30°; and 300 revolutions to 20°, the amount of variation being thus inversely proportional to the speed.

A NOVEL HORSESHOE.—A Berlin manufacturer is making a horseshoe of iron and hemp that is receiving considerable favor among the Germans. The shoe is of malleable iron carrying a deep wide groove, into which tarred hemp rope is firmly wedged. The rope is so thick that it protrudes beyond the rim of iron. The shoe is very light, and is said to be serviceable.

SCIENTIFIC PROGRESS.

Seeing by Electricity.

A correspondent of the *Scientific American* says that the device of "seeing by electricity" is not altogether new. The correspondent, W. E. Sawyer, of New York, writes as follows: "Early in the fall of 1877, the principles and even the apparatus for rendering visible objects at a distance through a single telegraphic wire were described at No. 21 Cortlandt street, New York, to James G. Smith, Esq., formerly superintendent of the Atlantic and Pacific Telegraph Co., and now of the Continental Telegraph Co., and to Messrs. Shaw & Baldwin, telegraphic constructors, now connected with the Continental. At that time the writer was engaged in perfecting an autographic telegraph by which maps and pictures were daily transmitted by telegraph over a single wire.

"The recent announcements of this discovery in three different directions, each undoubtedly independent of my own experiments, show how the same idea often occurs in separate minds. There is no likelihood of any plan of this kind ever being reduced to practice, for some of the difficulties in the way of all of the plans are insuperable, as will be apparent from the following reasons:

"1. The action of light upon selenium in changing its electric conductivity is slow; although new discoveries may remedy this feature.

"2. To convey with any accuracy an image, one even so small as to be projected upon a square inch of surface (I am speaking now of the apparatus you describe), would necessitate that this surface should be composed of at least 10,000 insulated selenium points, connected with as many insulated wires leading to the receiving instrument; for the variation of the 100th of an inch either way will 'throw a line out of joint.'

"3. The most delicate apparatus would not indicate a change in resistance by the projection of light upon merely a selenium point.

"4. Isochronism is unattainable, as required. The method I proposed involved the isochronous movement of the separate instruments. The transmitter consisted of a coil of fine selenium wire in a darkened case, having a diameter of say three inches. Light from the image to be transmitted was to be let into the chamber and upon the selenium coil by a fine tube which, starting at the periphery of the circle, would draw concentric imaginary spiral lines until reaching the center of the circle. Thus light emitted or reflected from the image to be transmitted would effect the selenium just in proportion to the brightness of the image at the different points within the compass of the circle traversed by the imaginary lines drawn by the opening in the tube.

"The receiver consisted of a darkened tube, having an inside diameter of three inches (corresponding to the transmitting circle) with its sides and bottoms absolutely black. In this tube, describing imaginary lines just as the tube in the transmitter, was a blackened index carrying two fine insulated platinum points very close together connected with the secondary wire of a peculiar induction coil, the primary wire of which constituted a part of the main wire leading to the transmitter.

"The transmitting ray of light and the invisible index in the darkened receiving tube were to start at the periphery and describe their spiral motions in exact unison until the center should be reached, and the speed being sufficiently great it is obvious that as the first spark between the receiving platinum points would not have ceased to affect the retina until the last spark, with the index at center, would have been produced, an exact image of the object before the transmitter would be reproduced before the eye of the observer placed at the darkened chamber of the receiver.

"But the trouble is to make the selenium sufficiently active, and to get the isochronous motion."

AZOTINE—A NEW PRODUCT FROM WOOL.—The *Annales Industrielles* notes a new discovery by M. Heddehault, which consists in the separation of wool from cotton in rage and waste products in which these two textiles are mixed, by treating them with steam at a 150° C. under a pressure of five atmospheres. Under the influence of this temperature the wool is decomposed, fuses, and flows off into a lower receptacle, while the cotton, flax, and in fact all vegetable fiber, are unattacked. It is then only necessary to pound and wash the latter to obtain products containing no longer any traces of wool, and which are admirably adapted for bleaching and manufacturing into paper. The solution of wool, evaporated by dryness, has been named by the inventor *azotine*. Owing to the increase in value of mixed cotton and woolen rags thus treated, especially for paper making, the cost of the operation is virtually covered, and the new product—*azotine*—costs really nothing. This material which is completely soluble in water, and which contains all its nitrogen in a soluble form, is to be used, mixed with dried blood, as a fertilizer. The invention is said to be an important one, both for the paper making industry and for agriculture.

ENCOURAGING SCIENTIFIC RESEARCH.—M. Pasteur has received from the French government the sum of \$8,000, to assist him in continuing and completing his valuable investigations upon the contagious diseases of animals.

THE CORROSION OF IRON.—Air alone does not corrode iron. Therefore, by the elimination of aqueous vapor and carbonic acid from the interior of closed iron vessels, the iron is preserved. This principle can be utilized in many ways for preserving unused steam boilers by thoroughly closing all orifices, and by heat causing the aqueous vapor to evaporate. Bursly proposes a cheap and simple method, by taking advantage of the affinity which calcium chloride has for moisture. He lays a flat, open vessel containing the calcium chloride in the iron vessel, and the air is soon freed from all moisture. As soon as the calcium chloride is saturated with moisture, it is useless and requires renewing. Water alone is also harmless in contact with iron, and if the ordinary water of commerce were evaporated in a vessel properly arranged to allow the escape of the air driven from the heated water, and then condensed before being allowed to enter the steam generator, corrosion would be almost completely retarded. This is, of course, assuming that the water was free from all injurious ingredients liable to deposit. But even with water highly charged with suspended matter in solution, it would be well purified by the preliminary evaporation and condensation.

DRYING THE AIR FOR METALLURGICAL PURPOSES.—Every furnace manager has been taught by experience how considerably the working of his furnace is affected by the state of the weather, and notably by the amount of moisture in the atmosphere. According to *Iron*, Mr. W. H. Fryer, of Coleford, Gloucester, has determined this cause of irregularity and expense by drying, or "dessicating," the air previous to its being blown into the blast furnace, Bessemer converter, etc., as the case may happen to be. In practice, the air to be forced into the furnace or Bessemer converter is passed over sulphuric acid or chloride of calcium, so as to deprive the air of the vapor of water contained in it. The dessicating material is disposed in a chamber through which the air is passed, the particular arrangement depending upon the nature of the material employed (whether solid or liquid) and its dessicating and other properties, the essential conditions of the arrangement being that the dessicating material shall expose a large surface to the air, and that the capacity of the chamber shall be such that the air will travel through it at a sufficiently slow rate to insure the thorough action of the dessicating material upon it.

A PECULIAR VARIETY OF COAL.—Mr. A. Inostranef describes, in the *Neues Jahrbuch für Mineralogie*, a peculiar variety of coal which occurs in the northwestern banks of Lake Onega, Russia, in strata stated to belong to the Huronian formation. It differs in its physical, as well as its chemical, properties both from anthracite and graphite. Pure varieties show a strong metallic luster, which remains even after exposure to a dull red. Its hardness varies from 3.5 to 4, and its density at 4° C. is 1.841. It is highly hygroscopic, an analysis yielding: Carbon, 95.50; hydrogen, 0.40; nitrogen, 0.41; water, 7.76; and ash, 1.01. When free from water the percentage of carbon runs up to 98.11%, so that it is richer in carbon than anthracite, though it contains less hydrogen, no oxygen and much nitrogen. The "black earth" from Olonez is distinguished from graphite, which it resembles much, by the fact that it does not yield graphitic acid or "Brody's graphite" with a mixture of nitric and sulphuric acids, nor does it burn as rapidly as graphite.

TELEGRAPHIC INVENTIONS.—Mr. R. E. House, the veteran telegraph inventor, proposes to revolutionize telegraphy by his new instruments for transmitting, receiving and recording automatically, at the rate of from 250 to 300 words per minute. As 40 words per minute is a pretty good rate at present, it is evident that the new plan, if it proves successful, will not increase the demand for telegraph operators unless telegraphic business is vastly increased; a result, however, which is expected, as it is claimed that, by the House system, messages can be sent at about one-tenth the cost by the present Morse system.

FIXING A MIRROR IMAGE.—A German scientist has succeeded in obtaining a chemical composition, by means of which it is claimed a mirror image may be fixed and sold as a photograph. With this composition the mirror surface is painted and the back part of the mirror receives also a coating of oil. The mirror thus prepared is held before the person who is to be photographed. The oil coating evaporates, and the likeness of the person remains in natural colors on the light surface. The image so fixed is brought into a bath, and is exposed half an hour in the sunlight before delivery.

NEW MAGNETIC EXPERIMENTS.—M. Ader has performed some interesting experiments upon bodies which are slightly magnetic. He finds that elder pith is more sensitive than ordinary wood, paper, etc. With a Jamin magnet, sustaining a weight of 220 lbs., and provided with two small polar armatures, separated by an interval of .78 inch, he has been able to attract, at a distance of .118 inch, a pith ball of .02 inch, suspended by a thread. He has been able even to raise it, and when once attached to the magnet considerable force is necessary in order to remove it.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Sept. 16	Week Ending Sept. 23	Week Ending Sept. 30	Week Ending Oct. 7
Alpha.....	61	51	52	51
Alta.....	3.05	2.10	2.30	1.80
Andes.....	1.90	1.70	1.55	1.70
Argo.....	50c	40c	55c	40c
Atlantic.....	45c	25c	35c	30c
Aurora Tunnel.....	11c	10c	11c	10c
Belcher.....	2.35	1.95	2.1	1.85
Belmont.....	45c	25c	35c	30c
Best & Belcher.....	11c	10c	11c	10c
Bullion.....	1.15	1.20	1.15	1.15
Butte.....	80c	1.20	1.15	1.15
Butte & Belcher.....	60c	50c	60c	55c
Bodie.....	51	51	43	43
Benton.....	1.20	1.15	1.35	1.15
Bulwer.....	21	21	11	11
Boyle.....	35c	25c	25c	20c
Black Hawk.....	1	50c	50c	40c
Belvidere.....	20c	20c	20c	15c
Booker.....	50c	35c	40c	35c
Chico.....	2.55	2.05	2.1	2.05
California.....	2.55	2.05	2.1	2.05
Challenge.....	3.80	3.30	3.70	3.35
Chollar.....	3.80	3.30	3.70	3.35
Confidence.....	40c	25c	30c	25c
Con Imperial.....	3.40	3.05	3.20	3.15
Con Virginia.....	3.40	3.05	3.20	3.15
Crown Point.....	2.4	1.65	1.95	1.85
Con Washoe.....	1.40	1.15	1.25	1.25
Champion.....	1.40	1.15	1.25	1.25
Concordia.....	20c	20c	20c	20c
Dayton.....	20c	20c	20c	20c
DeFrees.....	20c	20c	20c	20c
Danby.....	20c	20c	20c	20c
Day.....	20c	20c	20c	20c
Eureka Con.....	10c	10c	10c	10c
Exchequer.....	2.55	2.1	2.35	2.10
Endowment.....	2.55	2.1	2.35	2.10
Gen Thomas.....	2.55	2.1	2.35	2.10
Grand Prize.....	2.55	2.1	2.35	2.10
Gila.....	2.55	2.1	2.35	2.10
Golden Chariot.....	2.55	2.1	2.35	2.10
Golden Terra.....	2.55	2.1	2.35	2.10
Goodshaw.....	2.55	2.1	2.35	2.10
Gould & Curry.....	2.55	2.1	2.35	2.10
Hale & Norcross.....	2.55	2.1	2.35	2.10
Hillside.....	2.55	2.1	2.35	2.10
Higginbotham.....	2.55	2.1	2.35	2.10
Hussey.....	2.55	2.1	2.35	2.10
Independence.....	2.55	2.1	2.35	2.10
Julia.....	2.55	2.1	2.35	2.10
Justice.....	2.55	2.1	2.35	2.10
Jackson.....	2.55	2.1	2.35	2.10
Joe Scates.....	2.55	2.1	2.35	2.10
K. K. Con.....	2.55	2.1	2.35	2.10
Kentuck.....	2.55	2.1	2.35	2.10
Kosuth.....	2.55	2.1	2.35	2.10
Keystone.....	2.55	2.1	2.35	2.10
Lady Bryan.....	2.55	2.1	2.35	2.10
Lady Wash.....	2.55	2.1	2.35	2.10
Leopard.....	2.55	2.1	2.35	2.10
Loridian.....	2.55	2.1	2.35	2.10
Leads.....	2.55	2.1	2.35	2.10
Lee.....	2.55	2.1	2.35	2.10
May Belle.....	2.55	2.1	2.35	2.10
Modoc.....	2.55	2.1	2.35	2.10
Manhattan.....	2.55	2.1	2.35	2.10
Martin White.....	2.55	2.1	2.35	2.10
McClintock.....	2.55	2.1	2.35	2.10
Meadow Valley.....	2.55	2.1	2.35	2.10
Mexican.....	2.55	2.1	2.35	2.10
Mides.....	2.55	2.1	2.35	2.10
Morning Star.....	2.55	2.1	2.35	2.10
North Con Virginia.....	2.55	2.1	2.35	2.10
New York.....	2.55	2.1	2.35	2.10
Northern Bell.....	2.55	2.1	2.35	2.10
New Coso.....	2.55	2.1	2.35	2.10
Navajo.....	2.55	2.1	2.35	2.10
Occidental.....	2.55	2.1	2.35	2.10
Ophir.....	2.55	2.1	2.35	2.10
Oreana.....	2.55	2.1	2.35	2.10
Overman.....	2.55	2.1	2.35	2.10
Panther.....	2.55	2.1	2.35	2.10
Phenix.....	2.55	2.1	2.35	2.10
Phil Sheridan.....	2.55	2.1	2.35	2.10
Potosi.....	2.55	2.1	2.35	2.10
Prospect.....	2.55	2.1	2.35	2.10
Raymond & Ely.....	2.55	2.1	2.35	2.10
Richer.....	2.55	2.1	2.35	2.10
Rock Island.....	2.55	2.1	2.35	2.10
Rye Patch.....	2.55	2.1	2.35	2.10
Rough & Ready.....	2.55	2.1	2.35	2.10
Savage.....	2.55	2.1	2.35	2.10
Seg Belcher.....	2.55	2.1	2.35	2.10
Sierra Nevada.....	2.55	2.1	2.35	2.10
Silver Hill.....	2.55	2.1	2.35	2.10
Silver King.....	2.55	2.1	2.35	2.10
Silver Prince.....	2.55	2.1	2.35	2.10
Suitor.....	2.55	2.1	2.35	2.10
Summit.....	2.55	2.1	2.35	2.10
Synthetic.....	2.55	2.1	2.35	2.10
Ticon.....	2.55	2.1	2.35	2.10
Tiptop.....	2.55	2.1	2.35	2.10
Trojan.....	2.55	2.1	2.35	2.10
Union Con.....	2.55	2.1	2.35	2.10
Utah.....	2.55	2.1	2.35	2.10
Vermont Con.....	2.55	2.1	2.35	2.10
Ward.....	2.55	2.1	2.35	2.10
Wells Fargo.....	2.55	2.1	2.35	2.10
Woodville.....	2.55	2.1	2.35	2.10
White Cloud.....	2.55	2.1	2.35	2.10
Yellow Jacket.....	2.55	2.1	2.35	2.10

Sales at S. F. Stock Exchange.

Thursday A. M., Oct. 7.		145 Yellow Jacket.....	41	
AFTERNOON SESSION.				
80 Alpha.....	4	40 Alta.....	14c	
455 Alta.....	2.80c	2.95	250 Addenda.....	30c
100 Andes.....	2.05	1.35	500 Alhion.....	40c
400 Belcher.....	2.05	1.35	100 Argenta.....	35c
120 B & Belcher.....	8c	8c	400 Boston.....	35c
295 Benton.....	1.10c	1.05	320 Belvidere.....	10c
70 California.....	2.05	2.05	300 Booker.....	20c
300 Crown Point.....	2.05	2.05	335 Becthel.....	51
100 C Dorado.....	2.05	2.05	100 Belle Isle.....	20c
140 Caledonia.....	2.05	2.05	90 Bodie.....	41
170 Chollar.....	2.05	2.05	150 Columbus.....	31
150 Confidence.....	2.05	2.05	100 Comstock.....	50c
750 Con Virginia.....	2.05	2.05	100 Concordia.....	50c
400 Exchequer.....	1.35	1.35	200 Day.....	10c
340 Gould & Curry.....	3.60c	3.60c	200 E M Diahlo.....	20c
50 Golden Gate.....	2.05	2.05	125 Eureka Con.....	17
400 Hale & Nor.....	2.05	2.05	300 Goodshaw.....	25c
215 Justice.....	65c	60c	300 Goodshaw.....	25c
50 Lady Wash.....	8c	8c	110 Holmes.....	5c
300 Mexican.....	8c	8c	200 Independence.....	45c
50 Mackay.....	8c	8c	200 Juniper.....	45c
200 New York.....	2.05	2.05	275 M White.....	45c
265 Ophir.....	8c	8c	275 Mono.....	1.20
200 Overman.....	8c	8c	100 Mammoth.....	40c
330 Potosi.....	2.05	2.05	415 M Diahlo.....	24
155 Savage.....	4.60c	4.60c	625 M Potot.....	24
235 Sierra Nevada.....	2.05	2.05	25 Noamdy.....	1.20
245 Scorpion.....	1.45c	1.45c	120 Oro.....	1.30
370 Union.....	1.45c	1.45c	400 Queen Bee.....	10c
10 Utah.....	8c	8c	375 S Bover.....	60c
50 Ward.....	1.70	1.70	200 Toga Con.....	6c

The New York Herald's Paris special says: A syndicate for the construction of the Panama canal was definitely formed Saturday. Mr. Seligman and Messrs. Louheyran and Denier are at the head of it. It has been ascertained that the cost will be much less than at first estimated. The emission of a loan for 400,000,000 francs will be made about October 20th.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alhion Con M Co	Nevada	4	25	Sept 29	Nov 3	T B Chisholm	327 Pine st
Altas S M Co	California	1	60	Aug 13	Nov 2	R N Van Brunt	318 Pine st
Alta S M Co	Nevada	18	50	Aug 23	Sept 29	W H Watson	302 Montgomery st
Belcher S M Co	Nevada	21	75	Aug 25	Sept 27	Jno Crockett	327 Pine st
Bullion M Co	Nevada	16	100	Aug 16	Oct 28	C V Frazell	328 Montgomery st
Belvidere M Co	Cal	8	40	Sept 15	Oct 19	J W Hubbard	510 Pine st
Champion M & M Co	Cal	8	25	Oct 2	Nov 9	John Crockett	327 Pine st
Caledonia M Co	Dakota	9	80	Oct 2	Nov 11	D F Vordenal	327 Pine st
Caledonia S M Co	Nevada	32	25	Sept 14	Oct 20	R Wegener	414 California st
Butte Creek Hydraulic M Co	California	6	15	Sept 12	Oct 27	R L Taylor	320 Montgomery st
Exchequer M Co	Nevada	13	10	Sept 12	Nov 10	C E Elliott	327 Pine st
Goodshaw M Co	Cal	7	25	Oct 1	Nov 1	A F Main	309 California st
Gravel M Co	California	5	05	Sept 4	Oct 11	J M Buffington	309 California st
Hale & Norcross M Co	Nevada	66	75	Oct 4	Nov 8	J F Liehtner	309 Montgomery st
Julia Con M Co	Nevada	13	40	Aug 30	Oct 4	H A Charles	419 California st
Juniper M Co	California	10	40	Aug 27	Sept 29	E O Matten	327 Pine st
Justice M Co	Nevada	33	50	Sept 13	Oct 18	R F Kelly	419 California st
Justin White M Co	Nevada	7	50	Sept 4	Oct 24	J J Scoville	309 Montgomery st
Metallic M Co	Nevada	4	25	Sept 4	Oct 6	Wm Willis	309 Montgomery st
Mexican M Co	Nev	13	10	Sept 23	Oct 23	Wm Willis	309 Montgomery st
Monte Obispo M Co	Nev	4	10	Sept 21	Nov 29	B Burris	309 Montgomery st
Overman S M Co	Nevada	47	50	Sept 7	Oct 13	G D Edwards	414 California st
Prospect G & S M Co	Nevada	7	10	Aug 21	Sept 28	H P Bush	431 California st
Potosi M Co	Nevada	4	50	Aug 18	Sept 22	W E Dean	309 Montgomery st
Red Cloud Con M Co	California	8	25	Aug 17	Sept 23	Wm J Taylor	310 Pine st
Real del Monte M Co	Nevada	12	25	Sept 7	Oct 8	C V Hubbard	310 Pine st
Silver Hill M Co	Nevada	4	100	Oct 4	Nov 5	E P Holmes	319 Montgomery st
San Francisco Copper M Co	Cal	6	50	Sept 15	Oct 15	W W Stetson	309 Montgomery st
Sierra Nevada S M Co	Nevada	65	200	Aug 25	Sept 29	E L Parker	309 Montgomery st
Summit G M Co	Cal	6	25	Aug 12	Sept 11	W H Lent	309 Montgomery st
University M Co	Cal	7	10	Sept 6	Oct 12	W L Oliver	328 Montgomery st
Utah M Co	Arizona	11	02	Aug 20	Oct 23	J Penicost	702 Market st
Toga Con M Co	Cal	11	15	Sept 17	Oct 22	W H Lent	309 Montgomery st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

NAME OF COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Arnold Con G & S M Co	Nevada	3	25	July 10	Sept 6	A Judson	320 Sansome st
Bismarck M Co	Nevada	2	02	Aug 17	Sept 20	A K Durbrow	309 Montgomery st
California G M Co	Cal	50	05	Oct 5	Nov 9	E P Stone	306 Pine st
Cedar Hill Con M Co	Nevada	2	10	Sept 3	Oct 3	G A Rialton	320 Montgomery st
Con Reform M Co	Nevada	1	20	Sept 3	Oct 4	W R Wadsworth	609 Sacramento st
Day S M Co	Nevada	7	15	Sept 22	Oct 25	W W Pev	310 Pine st
Dudley S M Co	Cal	10	25	Sept 22	Oct 18	K C Masten	309 Montgomery st
Elmtracht Gravel M Co	Cal	5	100	Aug 24	Oct 1	H Kuntz	209 Sansome st
Exchequer M Co	California	5	25	Sept 2	Oct 1	Wm Willis	309 Montgomery st
Gopher Con M Co	Dakota	1	100	Aug 11	Sept 16	Theo Widman	404 Montgomery st
Headlight M Co	California	3	10	Aug 17	Sept 20	A W Rose, Jr	302 Montgomery st
Hazard Gravel M Co	Cal	5	7	Sept 27	Oct 7	J T McChiegan	318 Pine st
Leads M Co	Utah	1	10	Aug 25	Oct 4	N V Nicholson	327 Pine st
Mount Ross M Co	Nevada	3	05	Sept 10	Oct 18	L Herman	220 Sansome st
Marlowe Gravel M Co	California	8	10	Aug 26	Sept 30	J Morizio	328 Montgomery st
McElroy G M Co	California	8	13	Sept 2	Oct 5	Lewis Lillie	607 Washington st
Oakland G M Co	Cal	12	10	Sept 7	Oct 8	R D Hopkins	436 Montgomery st
Shingon Con S M Co	California	1	02	Aug 12	Nov 1	John E Mason	306 Pine st
Wolverine G M Co	Cal	1	10	Aug 23	Sept 24	F Meyer	408 California st
Yellow Jacket Con G M Co	California	1	20	Sept 1	Oct 2	A Feist	308 California st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Belvidere M Co	Nevada	C V Hubbard	310 Pine st	Annual	Oct 19
Catastrophe & Wide West M Co	Cal	W B Lake	240 Montgomery st	Annual	Oct 11
DeFrees M Co	Nevada	J T McChiegan	318 Pine st	Annual	Oct 29
Exchequer M Co	Nevada	W W Taylor	309 Montgomery st	Annual	Oct 2
Fairfax M Co	Nevada	O E Miller	324 Pine st	Annual	Oct 18
Numa M Co	Nevada	D Wilder	323 Montgomery st	Annual	Oct 19
Niagara M Co	Nevada	O C Miller	324 Pine st	Annual	Oct 13
McCrackin Con M Co	Arizona	A Wenzelburger	206 Sansome st	Annual	Oct 18
Northern Bell M Co	Nevada	W Stetson	320 Montgomery st	Annual	Oct 11
Red Cloud Con M Co	Nevada	J Taylor	310 Pine st	Annual	Oct 11
Spaulding & S M Co	Nevada	John Hein	117 Battery st	Annual	Oct 12
Silver West M Co	Nevada	F Runker	606 Montgomery st	Annual	Oct 19

LATEST DIVIDENDS-WITHIN THREE MONTHS

A LCCRY CAVE.—*Transcript*, Oct. 7: A few days since a large mass of earth came from the top of the tunnel in the Wimpup shaft, which is at Quaker hill, completely clogging the aperture. At first this accident was regarded as a calamity, but subsequent investigation inspires the belief that it was a fortunate circumstance. We are informed that from the appearance of the ground where it broke down, the miners think the tunnel extends along under the gravel channel, a fact hitherto unsuspected. Steps will at once be taken to demonstrate whether the supposition is correct or not.

A GOOD PICK OF ENGINEERING.—Last Saturday night the connection was made between the perpendicular shaft and upraise at the Murchie mine. The result demonstrated Mr. Eglebright's survey to have been very accurate, as the two met with a precision not often attained. This new shaft opens the mine at that point to a depth of 50 ft below the 800 level. The 200 ft below where the upraise shaft is now being trimmed and timbered.

STARK GRAYEL.—During the past summer (Joustra, Pendleton & Robinson have been engaged in searching for the gravel lead at Snow Point, being worked by Blackwell & Wand. They ran a tunnel into the ridge at a point south of the B. & W. mine. After getting in 200 ft they made an upraise which has just tapped a promising-looking deposit of pay gravel. Our informant says they have a prospect of opening a rich claim.

PLACER.

STARTED UP.—*Dutch Flat Forum*, Oct. 2: The difficulties met in getting all the machinery in working order in the cement mill, at the New Gold Run mine, have all been overcome, and the mill started up on Monday crushing cement.

EXTENSIVE WORKS.—We understand a San Francisco company propose putting in extensive works, in the way of undercurrents in the American river, this fall. This company has given Towle Bros. an order for 100,000 ft of cedar lumber for the purpose of building the undercurrents. This work will necessitate the employment of several men.

PLUMAS.

PAY GRAYEL.—*Plumas National*, Oct. 2: From Superintendent Johnson, of Eureka, we learn that the miners in the big shaft at Jamison have found pay gravel, but no bedrock as yet. Two pans showed a result of 50 cents. The shaft is over 200 ft deep, and it is thought that bottom will be reached in a short time. The company have expended considerable money, and the encouraging prospects are welcome. Should they prove this lead good, it would be the room for hundreds of miners.

NORTH FORK.—Mr. Sam. Ballou informs us that mining prospects are looking up in that region. The sale of the Savercool mine, and the building of a new 40-stamp mill by the new owners, will make business lively for a while and help the permanent prosperity of the section. It is probable that some other extensive sales of mining ground will soon be made.

BLACK ROCK.—*Granville Bulletin*, Sept. 29: Thos. McMurtry, of Clear creek, between Wolf creek and Big Meadows, was here on Saturday with some fine looking rock from his ledge. He has been prospecting for several years without success, but thinks he has been rewarded at last.

NEW MACHINERY.—R. M. Wilson, supervising engineer of the Plumas National mine, has arrived, and is superintending the erection of two concentrators and sulphur-saving machinery in the company's mill.

GOOD PROSPECT.—The Acadian company have struck another rich prospect in their shaft, which they are sinking.

SISKIYOU.

GRIZZLY GULCH.—*Yreka Journal*, Oct. 2: Bailey & Co. are still finding very rich quartz and a wide ledge, in sinking down at Grizzly gulch, on Indian creek, and several other parties have located claims in the vicinity. On the supposed extensions, Geo. Baker, Noah Williams, W. K. Lippert, Moses Jones and Hart & Thibault have staked out claims. Wm. McQuinn, superintendent of the Pacific mine, arrived in town from the Klannath on Thursday evening, and says he has commenced another cut with good success. The bedrock has not been reached yet, as a longer pump is needed, which he intends procuring. The Yreka Creek M. Co., since the cool weather, have secured a better supply of water, which allows about 11 inches of water to the elevator each day. About next Thursday or Friday the machine will be set down on the bedrock. The flume in which the gravel is thrown has been lengthened considerably, toward saving the gold. Bedrock may probably be found before the machine is moved, as it is higher on the east side than on the west side of the large pit, now being enlarged by the aid of the giants.

SIERRA.

BATA MOUNTAIN.—*Nevada Transcript*, Oct. 2: Six hundred tons of gravel from the Bata Mountain mine at Forest City are washed away weekly at present with water from the tunnel. The dirt pays \$4 per load. A party of ladies and gentlemen who went into the mine the other day had a thrilling experience. They had stopped a mile underground. At a point between where they stood and the mouth of the tunnel 23 cars loaded with gravel broke loose from the engine and started down grade toward daylight. After running a quarter of a mile a smash ensued, wrecking five cars. One man bravely ventured to stop the runaway train by running alongside the track and, in the darkness, putting on the brakes. He succeeded very well until he reached the fifteenth car, when unfortunately he made a misstep and received a fall, breaking his collar bone. It was several hours before the debris was made away, as the people in the mine could pass it and make their exit.

RICH RIVER.—*Mountain Messenger*, Oct. 2: It is said that a Chinese company, below Barabard's, have found a very rich spot in the river, and took out \$800 in one day.

NORTH FORK LEASES.—T. Marriott & Co. have leased the North Fork mine at Forest City, both gravel and quartz, for a term of two years. They have already struck better gravel than has been found for a long time, and will soon put on men and commence taking out pay dirt. The contractors are energetic and experienced miners, and we believe they have a good thing.

JAS. PATTERSON.—Of Excelsior hill, has bought out his partner, Jacob Kolb, and purchased nearly all the adjoining claims, thus making a fine mining property now.

BATA MOUNTAIN EXTENSION.—While over at Forest City early this week we were complimented by the accommodating contractors of the Bata Mountain extension with a ride through their air-line tunnel, 2300 ft in length, and around the bend 200 ft to the left and face, where 8 ft of a face is being made in rather soft bedrock. Walter Lawry, Denis Finane, Thos. Veale and Henry Fowler, the present contractors, assisted by Nicholas Frater and Oliver Hale—all old and experienced miners—are very confident of completing their thousand ft of tunnel by the 1st of next January, unless prevented from doing so by hard rock. A place is being graded for a timber house.

NEVADA.

WASHOE DISTRICT.

The following are from the weekly statements of the leading mines:

SAVAGE.—Have repaired and retimbered 13 ft of the main shaft and 0 ft of the 10th station, and then put the station force into the head of the incline, immediately under the station, to do some retimbering and repairing, in connection with the station work. Have driven the 10th-level drift 17 ft.

DECKARD.—Foundations for the pumping engine, etc., along the corner of the shaft to be used in hoisting at, all lowering pumping apparatus ready for use. Station at 2400 level for pumps is completed, and tank station there to supply the pumps is excavated. Commenced shipping machinery Saturday.

EXCELSIOR.—During a part of the preceding week we were engaged in timbering the north drift, 2510 level, in places to prevent its caving. The drift is now in 108 ft. The latter part of the week we were engaged in repairing the gallow frame (Imperial) and overhauling the blower engine on the surface.

CALDONIA.—The pumps have been run an average of 10 hours per day, consuming 7 1/2 tons of coal per day. The Furman shaft has been sunk and timbered 20 ft, total depth, 1,400 ft. The masons have finished setting the new boilers.

CON. IMPERIAL.—During the preceding week we have been repairing the gallow frame on the surface and overhauling the lower engine, so we have not been able to do any work in the mine proper.

GRANADA.—The pump foot is in place as far up as the 600 level, perpendicular shaft.

GODD & CURRY AND DEET & BRECHER SHAFT.—We have sunk during the week 25 ft; total depth, 1,665 ft.

EUREKA DISTRICT.

EUREKA TUNNEL.—*San Francisco*, Sept. 28: The Eureka tunnel is now in 1,457 ft, the face still being in shale. The shale belt has been penetrated 100 ft, and it is believed to be from 30 to 40 ft wider. When the west of this shale is reached, it is believed our will be encountered. The Superintendent is also prospecting for drifts in several places, everything being done in a thorough and systematic manner. The blacksmith shop and sheds which were burned by fire a few weeks since have been replaced by iron buildings, and other improvements made, all showing the confidence the projectors have in the future development to be made in Prospect mountain at depth; and every practical miner in the district believes it will prove to be the largest property upon the mountain, as it will also afford facilities for working many mines now lying dormant.

MOREY DISTRICT.

THE MINES.—*Belmont Courier*, Sept. 1: On the 200 level of the Magnolia ledge, one of the Morey Co.'s group of mines, is a 15-inch vein of argenteous fair ore assaying \$200 per ton. This strike is important. Hitherto the mines have been producing \$8,000 per month, but lately the shipments of bullion have doubled. From the present outlook and the new developments in the deepest workings of the Magnolia, one of the ledges owned by the Co. and the Kaiser, another ore-producing ledge from which high grade ore has been extracted near the surface, the camp never looked better, and promises to be a bullion producer for some time to come. As soon as the stopes are properly opened the mill will be run on full time. Every opportunity is offered visitors to examine the mines. The Morey mines several years ago were indifferently worked for some time, and with limited success. Lately they fell into the hands of the Bernheimers, bankers in New York City, the present owners and managers who are sojourning in the future as to make it a largely producing and dividend-paying property. Many improvements have yet to be made in the working of the mines looking in the future to their being systematically and profitably operated. Since the mines have been worked to a depth the ore greatly improves in quantity and quality.

WARD DISTRICT.

SMELTING ORE.—*Ward Reflector*, Sept. 28: Ore of a smelting character has been discovered in the Madre tunnel. We are informed by Robert Briggs, Superintendent, that will go as high as \$70 per ton. How large a body has been struck is not yet known. The tunnel is now in about 400 ft.

ARIZONA.

MINERAL CREEK DISTRICT.—*Silver Belt*, Oct. 25: Mr. Putnam, of Riverside, called on us last Tuesday, and was very enthusiastic about the prospects of the Mineral Creek project. The late copper finds there are astonishing. Mr. Boulanger is shipping ore which carries 40% of copper. There is a good road from Riverside to the mines, which are about 15 miles from the town. Putnam forms up the Boulanger is an old copper mining man, that he has visited the Lake Superior and Clifton countries, and has not seen anything at all comparable with this new copper region.

THE VERDE.—Messrs. House & Rouse, of Tonto basin, report that in their camp everything is quiet, but that on the River Verde times were lively. Their mine, which we are assured is the best in the border of Sonora, is rich in copper. They have 150 tons of good ore on the dump, and the mine is looking well. They tell us, that on the East Verde the miners have taken out a ditch to carry water to arastras, by which process they intend for the present to work their ores. The mines along the Verde are gold mines.

GOLD DISTRICT.—Messrs. Thornton, Hogarty & Winber, made a discovery about two weeks ago, which consists of a vein 5 ft wide carrying mineral its entire width. The mine is known as the California. Work has been commenced on this La Plata, and we now look for some good returns from that property. Mr. Edward Ayers who has been for some time night foreman at the Silver Nugget mine, but not in the employ of the company at present, tells us that the mine is in excellent condition, and says that it is one of the best mines he has ever seen. He says that the whole country is seamed with veins, and that the best developed of the mines are only hinting at what lies beneath. Agnacio Campbell is smeltering copper, 4 miles south of town. A 1,000 lbs. lot of copper, also carrying gold and silver, 95 fine, can be seen at S. Klein & Co.'s store. It will be shipped to San Francisco for separation, with a view of ascertaining whether or not it will carry gold. An old friend Capt. Tucker has, through his untiring perseverance, blown the whistle of the Townsend mill, and are long we shall expect to take a good look at his gold bullion. The pump for the Nugget mill has been received and is now being put in place. The Clipper, belonging to Chas. Prather, is revealing rich ore which fills the bottom of the shaft.

BULLHEAD.—*Arizona Citizen*, Sept. 23: The Tombstone mill and mining company shipped from Millville during the past week bullion valued at \$22,038.04.

THE ALTA.—As work progresses on the Alta mine at Harshaw, of which Hon. J. K. Luttrell is manager, it begins to be demonstrated that it is one of our coming bonanzas. Word reached Tucson this morning that at a depth of 100 ft the mine is in a large body of rich ore, and the following assays are given: \$270.00, \$335.40 and \$332.55.

BIG PRODUCTION.—The Copper Queen smelter at Bisbee, in the Mule mountains, is a bonanza, and no mistake. It produces copper bullion at the rate of 700 lbs per hour, or 17,500 lbs per day, or 504,000 lbs per month—252 tons. This copper, at the latest quotations, is worth \$100 per ton, and the cost of getting it to market is 25 cents per lb, leaving the value of the mine's production, in round figures, \$93,000.

IMPORTANT STRIKE AT SAN XAVIER.—The mines of the San Xavier mining and smelting company are of great importance to Tucson, as they are the nearest to the city of all our productive mineral properties. It is, therefore, with pleasure we record a new strike in the western extension of the San Xavier mine. The locality of the rich find is in chamber No. 1, on the south crosscut on the 100 level, and consists of the whole face of the chamber being in a very large body of galena ore, assaying 76% lead and 70 oz of silver to the ton. The extent of the body is of course not yet known, but the indications are that it is very large. This property is rapidly being taken to the front as a very rich property, and its successful operation will prove of immense benefit to Tucson. The new smelter is at work, though it will be some time before the production of bullion will be as steady as when experience has taught all the particulars for working the ore to the best advantage.

COLORADO.

ERIE SMELTER.—*Georgetown Courier*, Oct. 3: The Erie smelter company at Junction have commenced hauling ore from the Smith & Oray mine, having purchased 50 tons as a sample. There are now over 100 tons of ore on the dump. The four great mines of Custer county, the Bassick, the Bull-Domingo, the Silver Cliff and the Plata Verde, have given employment to 500 men for several months. A smelter is building at Arboville and good prospects for another at Junction and Garfield City. Buenos Vista will have a smelter and sampler before the end of the season. The Mt. Shavano smelter, at Mayville, made a successful run last week, reducing in 5 days all the lead

ores on hand and producing 5 tons of bullion, valued at \$2,000, besides shipping 4,000 ounces of dry ore. The smelter at that place has given a fresh impetus to mining matters on Battle and Horn Silver mountains. The Union mine on Mineral hill, at Breckenridge, has been sold for \$50,000. Eastern parties were the purchasers.

CAIRNDALE LODGE.—*Register-Call*, Oct. 1: The Italians who discovered and have been working this silver-bearing vein at the mouth of the left-hand fork of Missouri gulch, are now down to a depth of 110 ft. A drift east, at the depth of 100 ft, has been driven 30 ft, and a vein of mineral averaging 4 inches has been uncovered. Messrs. Locke Bros. & Hunderman, while not working as strong a force of miners as formerly in the Hlad Money lode, have good ore bodies at different points in the mine. Col. Smith, agent of the Silver King mining company, has struck into a rich body of ore in the Alaska mine. The crevice is unusually rich for a silver vein, and is quite rich in silver and lead. Prof. S. W. Tyler, agent for Eastern parties, has let a contract for sinking the main shaft on the Return lode. A new whim has been erected to facilitate hoisting the material mined.

THE BOSS LODGE.—Messrs. Sayr & Owen have been proving up the extreme easterly portion of the Boss. A tunnel shaft vein has been struck at a depth of 100 ft, which will be driven until it intercepts the deep gr main shaft.

IDAHO.

RAY HORSE.—*Cor. Yankee Fork Herald*, Oct. 2: At Bay Horse, 10 miles from Oballs, we found the smelter all set for running and waiting only for a supply of charcoal. In the bins were 700 tons of ore to start with and more coming down from the mines. There are 15 or more mines sending ore to the reduction works at the Ramshorn. Hood, Beardsley, Fults, O. K. Excelsior (Ute Boy, Bull of the Woods, Silver Wing, Skylark, Keystone, Little Fellow, Cabin and some others. The Rob Roy and Centennial are also getting out ore. The Ramshorn Co. has contracted to deliver 300 tons of first-class ore as fast as it can be got out; the Faithful Boy 100 tons, and the Beardsley is furnishing 20 tons per day of ore that runs high in lead and low in silver, and carries the base of the reduction of the high grade ore. A number of the mines mentioned are on what is known as the Ramshorn vein—the longest continuous quartz lode known to the mining world. There are 29 1500-ft locations on it, and ore found on every one of them, making it all of 5 miles in length. The smelter is a most perfect piece of work for reducing base ores, and has been erected under the immediate supervision of experienced smelting men. The organization is known as the Bay Horse mining and smelting company of Omaha. E. W. Nash is Secretary and Treasurer, A. J. Crook, General Manager and Smelter and Geo. B. Moulton is the mining expert of the company. Jas. A. McNab, of the Ramshorn, attends to the sampling of the ores from the various mines. The smelter is about 30 tons capacity, is favorably located on Bay Horse creek and in a very fertile and high grade silver belt. The establishment of the Bay Horse reduction works has put new life into that portion of our mineral field, and the long looked for boom has sent the Bay Horse off on a gallop and brought joy to the heart of many an honest miner.

KINNICKINIC DISTRICT.—Leaving the Bay Horse works we took the trail over a distance of 15 or 16 miles, to Kinnickinick. We found another field of active mining operations. Where two months ago there was not even a decent trail, we now find a brisk camp, good wagon roads, safe and easy means of transporting goods and machinery, and smelting works fast approaching completion. The company operating at Clayton, mouth of Kinnickinick, is known as the Salmon River mining and smelting company of Omaha. The president, W. W. Lowe, General Manager and Treasurer, and W. L. Cusland, Superintendent. The well developed mines in the vicinity of the works are numerous. The ores are both abundant and rich, and the company owns some valuable properties. A good wagon road has been made down a tributary of East Fork to the main stream, thence down 6 miles to Crystal, mouth of East Fork. From there the road runs 2 1/2 miles to the south of the mouth of the Salmon, where the stream is being substantially bridged. From the bridge it is 1 1/2 miles up to the reduction works, where quite a brisk town is springing up.

EAST FORK.—From Crystal to the mines on head of East Fork is 38 to 40 miles. The trail is a moderately good one. The valley of the East Fork is from 1 to 1 1/2 miles in width, and covered with heavy timber. Along the bottom of the valley the company has about 25 locations, most of them on the rim of a basin at the head of a small creek 2 miles long and on the north side of the North Fork. The ores are galena, carbonates and free milling. The highest grades of ore from which assays have been had, give from 300 to over 700 ounces silver per ton. We visited some of the principal locations, and found them to contain strong veins of fine silver ore. Among the most prominent veins are the Germania, Old Bible, Cal, Cresson, Full Hand, Karnace, Alta, Idaho, Sanderberg, Arctic, Warsaw, Silver Shield, Top, Silver Bell, Deseret, Washington, Yellow Jacket, Olden Wonder, Sperling, etc. Several tons of shipping ore are out at the Idaho, and the owners of the Germania have 10 tons of ore sacked for shipment to the Bay Horse smelter. It is clear galena and assays from 100 to 300 ounces silver per ton.

MONTANA.

ARGENTA.—*Butte Miner*, Sept. 30: Argenta, the pioneer camp of the Territory, is looking very favorable just now, with a good show for the future. This camp has for several years been partially abandoned, but there is much good smelting ore in the district, some of which will be worked within a year. Mr. Smith Ball, operating the Tootle & Hanna furnace, is doing well. He has a large miscellaneous lot of galena ore (120 tons) which yielded \$10,077 in gold, silver and lead. The furnace last week finished a run of 80 tons of ore which produced 18 tons of base bullion of good grade. The furnace is now running on Bully, Legal Tender and other ores of the district that will result well. Some of the mines in the Argenta district are looking fine, exposing splendid bodies of galena and carbonate ores, carrying both gold and silver in paying quantities.

CON. BRAY & SON.—Have a new opening on the Legal Tender of 4 to 5 ft of high-grade galena ore. Life Scott has his Bully lode surface opened for a distance of 200 ft. The vein is 3 to 4 ft thick from top to bottom, sampling 40% to 50% in lead, 60 to 80 oz in silver and \$3 to \$11 in gold to the ton. The old Tootle & Hanna lode Messrs. Tootle & Hanna have just commenced operations. In the Argenta district quite a number of mines will be worked from now on—among them Life Scott's Tootle & Hanna and Tilden, the Paymaster, Stapleton, Fletcher's Gov. Tilden. There is enough good quartz prospected to run the Tootle & Hanna and the Seligman furnaces all next season. The ore will be mined the coming winter, and the old Argenta camp will be running two furnaces next season.

ALICK.—The stopes, though wide, are all in ore, no attempt being made to extract the full width of the vein. Crosscutting from the 700-ft station has not yet been resumed, as the discharge pipe has not yet arrived.

ORAY ROCK.—Operations in the new shaft, which got to be too deep for the successful working of the whim, are still suspended, awaiting the arrival of the necessary steam-hoisting machinery, which is expected in a few days.

GAGNON.—The first-class ore is being shipped East for reduction, and the second class is treated at the Colorado works. The present machinery is thought to have power sufficient to sink to a depth of between 400 and 500 ft.

COLUSA.—The new shaft is making excellent progress, and is now down 110 ft. It will probably pass through the vein within the next 50 ft, after which a rather heavy volume of water may be expected. The hoisting gear for this shaft will be the largest in the Territory.

STAR WEST.—The two shafts, at a depth of 100 ft, have been connected by a drift, which shows a continuous vein of high-grade ore from one to the other. It varies from 2 to 3 ft in thickness, and possesses an average assay value of \$200.

BUTTE NEWS.—Another huge mining enterprise is on the tapis in Butte. A new strike of rich ore is reported on a claim near the Centennial mill. The Rocker mill has been

purchased by Mr. Robert McMillin, and will be remodelled. The concentrating works, lately fitted up by Bosrdman & Sons, some distance south of the copper smelter, have been started up with very encouraging prospects of success. The daily capacity is 15 tons, and the first run is being made on Parrot ore. There is no camp in the world which can boast of so many paying mines and so few non-paying ones as Butte. The air tramway connecting the Colusa mine with the smelter has been finished for the first 500 ft. Its highest point will be 60 ft. The bulk of the hoisting machinery for the new Lexington shaft is being manufactured in Butte. The Silver Bow mill is putting through a 100-ton lot of Pacific ore. If the run proves satisfactory, the Pacific will be opened up with a big force. It is one of the largest veins of the camp. The Alice company yesterday shipped 5 bars of bullion valued at \$10,000. The 200-ton ore dump of the Pacific mine is being shipped to Silver Bow mill. It is stated on good authority that the southern portion of the Crow Indian reservation will shortly be restored to the public domain, in order that the Clark's Fork mines may be located and developed. The Crows will interpose no objection.

NEW MEXICO.

NEW MEX.—*Herald and Southwest*, Sept. 25: The 10-stamp mill at the Massachusetts and New Mexico mining company started up in earnest last Monday, and during the week, crushing ore at the rate of about 10 tons per day. All the machinery works smoothly. The ore, as taken from the bins, is first passed through a No. 3 Dodge crusher, which reduces it to a suitable fineness for the Challenge self-feeders, through which it passes to the battery. The stamps are run at the rate of 90 drops a minute, and have a crushing capacity of 10 tons of ore per day. Through a 50 mesh wire screen, the pulp passes into 7 tanks, and from the lowest of these the surplus water runs into a reservoir below, whence it is pumped up to be again used in the battery. It is claimed that by repeated use of this water, the chlorides and other refractory elements are brought to a condition in which they can be readily amalgamated. Below the tanks are 4 elevating screw amalgamating pans, which play a joint capacity of 20 tons per day. Still lower are 2 Wheeler & Randall's rollers, 1 Agitator and 1 True concentrator. The mill is run by an engine of 145-horse power, although at present only about one-third of this power is used. The company has about 1,100 tons of ore on hand, assorted and ready for the mill. In addition there are nearly a hundred tons stored in the shafts and drifts of the mines, besides large quantities in the various dump piles now being assorted. There are no less than 9 points on the Legal Tender where men can be put to work and ore taken out in large quantities. The assay office and laboratory are undoubtedly the most complete in the Territory, and the retort and refining room are fitted with everything required for thorough work. A clean-up will be made early in the week, and this company will soon be adding regular shipments of bullion to the product of Grant county.

NOTHING YET.—*News and Press*, Sept. 30: The Diamond Drill company have already penetrated 200 ft into the side of the mountain at Poul Park, and although the core shows that they have crossed several small veins of mineral, they have not yet struck any that they desire to develop.

OREGON.

QUARTZ AND PLACERS.—*Redrock Democrat*, Sept. 26: The mining, both quartz and placer, throughout our country for the past season has been of the most satisfactory results. Without doubt, instead of diminishing, the mining industry in this section is greatly on the increase. Hardly a day passes that we do not have to chronicle new discoveries, and of the very richest class. Rich silver ore has been discovered lately near the mouth of the New England and Oregon mining company at Rye. The mine has struck it rich in the Oreen discovery. The vein is good sized; some of the samples assaying \$10,000 per ton. Powers & Co., of Rye Valley, are still mining their hydraulic claims. They will clean up for this season some \$25,000. The Connor Creek mining and milling company keep their 2-stamp mill running night and day on the rich Oreen discovery. The mine is a very rich one, and the Monumental mine and mill will start up this week, with expectations of a large output. They have a rich ledge. The new mill recently erected on the Tom Payne ledge (Hayes & Co., near Peachontas, is turning out large amounts of bullion daily. Placer miners generally have done well throughout the county, and their clean-ups very satisfactory. Last week \$10,000 in dust was sold at the Butte & East Fork assay office. W. W. Wilson, of Mt. Fort is up in the Orianite Creek mountains with a large gang of Chinamen building a ditch to carry water on some very rich gravel claims. The Sutton Creek quartz excitement remains unabated. Large pieces of gold, mixed with a little quartz, are being found daily. Joe Lee & Co. recently cleaned up \$3,000 from their Clark's creek claims.

CLARK'S CREEK.—James Noris, Kidd & Tatro made a very rich clean-up from their placer claims last week. Several persons, working what is known as the Bar claims, are realizing splendid results. They have a "Little Olan" hydraulic at work on these claims, and working out considerable ground. Everyone in this burg seems to be happy and contented. Two different mines have turned out well for the past season, with a brighter future in store.

UTAH.

ALTA DISTRICT.—*Salt Lake Tribune*, Oct. 2: The Eclipse mine is a separate property from the Flagstaff, and all of the portions of the former mine that the latter has patented. The Emma is looking well for the depth zone. The incline shaft is now down about 150 ft below the level of the Bay City tunnel. The rock now worked in indicates the near approach to mineral. The workings of this company are not made public. Of the Silver Bell sale there is nothing new reported, although rumor had it that the sale had been accomplished during the week.

PINE GROVE DISTRICT.—From Mr. C. W. West we learn that the mines of Pine Grove district are looking well. The property of the Consolidated company develops well. The shaft on the Carrie Lucille is down 90 ft, and samples from the ledge assay 300 lead, 176 oz silver and \$15.07 gold per ton. The ore is about 100 tons of ore on the dump that averages as quoted above, and the company is now making arrangements to ship either to Milford or Frisco. The ledge averages 5 ft in width. The Hidden Treasure has 18 inches of very fine carbonate. This claim is north of the Carrie. A new vein has been struck inside the Miller lines which is said to be far superior, in extent and quality, to the original ledge on which the discovery was made. There are now only 12 miners at work on the claim, besides a few prospectors. Pine Grove district is situated about 25 miles southwest of Frisco, and over the range from Waw-Waw Springs. The country is well watered, and timber is abundant, as the name of the district would indicate.

PARK CITY MINES.—The bullion shipments from the Ontario mine the week ending the 24th amounted to \$347,200. The surface water tunnel at the Hawkeye is about completed, and sinking will be resumed next week. Soon there will be 3 steam whistles in McHenry gulch, where for 8 years prospecting has been carried out without a pound of machinery. The new salt batteries at the Ontario mill are working very successfully. It makes a difference in the amount of ore crushed of 10 to 12 tons every 24 hours. Drifting in the Olencoe started up again on Wednesday morning. There is between 40 and 50 tons of ore on the dump which will average 50 oz silver and 40% lead. The mines are all getting in their winter supplies. Wood, for fuel, is one of the necessities that is getting scarce, which will be supplied without stint when the railroads reach us. There are vast forests along the Weber river from which the wood can be floated down to the depot at Wanship.

The product of the Idaho mine for the month of September was \$40,000. The usual monthly dividend of \$5 per share, amounted to \$15,500 has been declared.

Silver Cliff's Mines and Mills.

A correspondent of the N. Y. *Tribune* writes as follows from Silver Cliff, Colorado: The future of this city is now assured, and strangers not conversant with mining camps can hardly believe that on the present site of this hustling city but two years ago roamed herds of cattle, and the howl of the wolf and coyote was the only sound that broke the stillness of the midnight air, where now are heard the blast of the miner and the pounding of our mill stamps. Our mines are constantly growing in value as developments progress, and ores are found rich in chlorides where no experienced miner would ever think of prospecting. In fact, our camp is an anomaly and breaks down all established precedents in finding ore rich in gold, silver, copper and lead.

The Racine Boy mine, the first discovery in our camp, has been steadily worked for two years, and to-day shows richer in ore and more extensive in deposits than was anticipated by the most sanguine of its owners. Openings are now being made on the face of the cliff in the adjoining properties, and all show one general formation of deposit, carrying chlorides in greater or less quantities. The Racine Boy mill of 40 stamps has not been a perfect success; nevertheless, when it has been in repair, it has steadily produced near 1,000 lbs. of bullion per day of 24 hours and this from 35 tons of ore, giving an average of near \$50 per ton.

Ground is now being broke to erect a mill of 60 stamps. This mill is to be of wet process, and it is predicted will crush 150 tons per day of 24 hours. Should this prediction be fulfilled it will show a production of bullion of at least \$4,000 per day, and this company have ore enough in sight and prospected for to last a generation.

Extending north and west from this company's mines are hundreds of mining claims that indicate the same general formation, and there is no question but that in the near future, with milling facilities, thousands of tons of ore can be produced that will pay liberally over both the labor and milling expense required in transforming the ore into bullion.

I shall not attempt to enumerate the large number of mines that are idle for the want of milling facilities, but can say without fear of contradiction that at least 1,500 tons of ore could be produced daily had we the milling facilities to treat the ore at a fair profit—the estimates being from \$4.50 to \$6 per ton.

I find it impossible to particularize in the large number of new discoveries that have been made in the past few months. Most of them have upon development increased in richness, and consequently in value, and Silver Cliff's future as a mining center has no equal when capital will find its profit in giving us the facilities to reduce our ores to bullion.

Grand View Mining District.

The Esmeralda *Herald* says: On the 17th of last month a meeting of the miners of a portion of what has heretofore been known as Mount Grant mining district, and those of the eastern slope of the Mount Grant range of mountains, bordering on the southwest portion of Walker lake, was called for the purpose of taking into consideration the propriety of forming a new mining district, the election of a Recorder, etc.

At the meeting A. G. Nowles was elected Chairman, and W. A. Virden Secretary. By a unanimous vote of those present, it was decided to name the new district Grand View. Its boundaries were fixed as follows:

Commencing at the mouth of Wildcat canyon, at the eastern base of the Mount Grant range of mountains on the southwest side of Walker lake, in Esmeralda county, and running thence four miles in an easterly direction to Walker lake; thence five miles along the western shore of Walker lake in a northerly direction; thence through the Blanchard pass in nearly a due west course to a point one mile below Buchanan's camp, on Cottonwood creek; thence two miles in a westerly direction to the summit of the range of mountains on the west side of Cottonwood creek; thence along the summit of the high range of mountains, on the west side of Cottonwood creek and Lapham's camp, to the high peak of mountain nearly north, and about one and a half miles distant from Wm. Barne's ranch and camp; thence across the south end of the Compton meadows to head of Wildcat creek; thence along the head of said creek to the place of beginning.

ANOTHER MINING DISCOVERY.—Some weeks ago an old prospector discovered a large and well-defined ledge of silver and gold-bearing quartz, in a porphyry country, on the high divide between East Walker river and the Sweetwater, about 35 miles west of Bodie, and since the discovery considerable work has been done upon the ledge, proving it to be of great value. The assays run up from \$15 to \$117 the ton, while some selected samples of the ore submitted to a fire test in a forge, gave out numerous globules of silver. Only six or eight locations have yet been made, and the exact locality of the new find is known to but few. The facilities for working are of the best, wood and water being abundant just below the mines, while the topography of the mountain on which they are situated is such that the ledge can be tapped at great depth by shafts.

The Comstock.

This body of ore just cut on the 2000 level of the Ophir, though not strictly speaking a new discovery, promises to prove very important of itself, and may lead really to a first-class deposit. They now have from ten to twelve feet of good milling ore. This alone, anywhere outside of the Comstock, would be thought a very good mine. Even though the vein should be found to grow no wider, a great deal of money can be taken out of it. As it is wider than where cut in the California, the vein is doubtless increasing in strength to the northward. In drifting along in that direction a large deposit is liable to be found. Also, there is room between the 2000 and 2500 levels for a first-class bonanza.

The work that has thus far been done on the 2500 level is too far to the east to strike the deposit. Whether or not the upraise will cut it remains to be seen. To follow the ore north and south, up and down, through all its ramifications, will be the work of some months. In doing this work, however, ore will be coming out right along.

Mr. Mackay says he has the most implicit faith in the Comstock showing good bonanzas of ore at the greatest depths we shall be able ever to attain. His idea is that in all those sections of the vein that have proved fertile, will again be produced bonanzas at some point below. He says: "Although we may not get these bonanzas in the next five years, still they will be found."

By this he did not mean to say that it would be five years before bonanzas would be found in the places where ore is now beginning to make its appearance, but that along the lode in all fertile sections bonanzas will again be developed, though it might yet be five years or more before they would be hit upon.

His reason for so believing is that the ore found at the greatest depths yet attained, is as clean, free and pure as it was above—that it does not run to iron, lead and other base metals. Also at great depths the quartz is as bright and the material of the vein as full of life as any point above. The principal trouble just now is that at most points there is too great a width of this vein material.

During his recent trip to San Francisco, Mr. Mackay had a conversation with Clarence King in regard to the probability of ore being found at great depths in the Comstock. He found Mr. King's views coincided with his own in every respect. As regards water in the direction of the Yellow Jacket, and at other points where considerable quantities of water are now making their appearance, he does not think there will be more than may be handled with any great trouble. Indeed, he takes a very hopeful view of the situation along the whole course of the vein, believing that in the future as in the past there will always be some point along the great mineral channel from which ore will be seen coming out.—*Virginia Enterprise*.

Silver Cliff.

The Silver Cliff *Prospect* says: It is tonnage that makes mining camps permanently prosperous. This single fact which should be patent to all is an important factor to be considered by capitalists desirous of engaging in, and legitimizing, the production of silver ores and the elimination of their values.

Ore veins so concentrated by nature as to be extremely rich, oftentimes enrich their owners, regardless of comparative inaccessibility, the necessity of transportation by primitive methods to and from points remote from the mines and notwithstanding climatic influences which render transportation and continuous working throughout the year an impossibility. The tendency to search for short roads to wealth is common to all men, and to many it is irresistible.

With the latter class, it is useless to argue that the shortest roads—or those which look to be so—are not always the surest or easiest.

They will continue their efforts to scale impassible mountains and penetrate impenetrable canyons, to live, devoid of home comforts—in cabins unadorned by the graces of civilized society until they lose—or forget—the refinements of life in the vain search for refined gold and silver, which, if found, would not be worth the sacrifices made to obtain them. It is not, however, the purpose of this article to point out and moralize upon what we deem the weaknesses of men who are probably strong where we ourselves are weak, but rather to state as clearly as possible, some reasons which have occurred to us for believing that Silver Cliff will be a prosperous commercial and bullion producing center when numerous other camps now claiming public attention, the mines of which are located midway between timber line and the eyerows of the "Man in the Moon," will have become reminiscences. Here where outdoor work is practicable every day in the year, where every mine is accessible by fine natural roads, with a large area of arable land, the products of which are a continual check upon the market for food supplies, capital and labor, brain and muscle can and must work together in the production of nature's economic wealth.

It is not the accumulation of vast wealth in the hands of a few, but its production and diffusion among the many that works the greatest good to the greatest number and builds up and peoples populous cities and States.

Mine products so compact and rich as to bear

help to swell the wealth of communities where such mills are located, while the mines in most cases remain for an indefinite period surrounded by comfortless cabins and "dug outs," which are in time deserted by men and become the habitations of owls.

But on the other hand in a region where ore bodies are vast in extent, and their values so diffused throughout the whole mass that they can only be eliminated successfully and profitably with the aid of expensive machinery, the result is widely different.

Once established that such ores can be mined and converted into bullion at a cost which will leave a large percentage of profit when done upon a large scale at the mines, money which fails of profitable employment elsewhere, will be used in the construction of mills. Labor will find remunerative employment, and 50% or 75% of the bullion product—in money—will flow into the channels of trade around and among the homes occupied by the workers and their families.

The continued healthy growth of Silver Cliff is a signal illustration of the happy results which spring from the harmonious working of labor and capital in the development of mines and the treatment of low grade ores.

A little more than one year ago, we had no machinery, and but one mine that was producing ore, in quantity, sufficiently rich to leave a margin over working expenses, after deducting the cost of wagon and rail transportation, with cost of treatment elsewhere. Very few believed then in the permanence of our camp; but now all is changed. The introduction of machinery at an aggregate cost, in cash, of \$1,000,000, which yields a large revenue to the owners so long as it is in motion—but would deteriorate rapidly if allowed to be idle—has wrought a magical change in this camp by creating a feeling of confidence in its future, which is drawing hither additional capital to be wielded by representative men of the more enterprising class from every Eastern State.

The four great mines of the camp now prepared to treat their output, the Bassick, the Bull-Domingo, the Silver Cliff, and the Plata Verde, have given employment to 500 men for several months.

The wages of these men and the supplies purchased here by the companies, sum up about \$90,000 a month, and with all their machinery in active use, as it will be soon, these several companies will add more than \$400,000 a month to our bullion product.

This fact demonstrated as it will be this season, if the management avoid the unwise policy adopted by Leadville organizations, of exhausting their reserves in order to pay large monthly dividends, the mine now here will form a nucleus around which will spring up millions of dollars worth of machinery next year and the year after, giving employment to thousands of men, who will use their money in building and beautifying homes here in the picturesque Wet Mountain valley.

With an inexhaustible ore supply yielding thousands of tons daily, all of which will be reduced to bars of silver and bullion here, the truth of the sentence at the head of this article will be apparent at home and abroad, and our predictions, farther on, as to the future prosperity of Silver Cliff, will be in the way of verification.

SAN XAVIER.—J. Andrews, who has charge of the work on the San Xavier mining company's property, came in from the mine last night, and from him we learn that the company's new smelter was started up on the 1st, and worked to the complete satisfaction of all concerned. It was run a day or two and then shut down to finally complete the arrangements, and to remedy such trifling defects as the experimental run disclosed. In a few days everything will be in order, and then the smelter will set out on a cruise which everyone hopes will be extremely profitable to the owners of the mine. It is a 30-ton furnace, and is located about eight miles from the mine, from which the ore is hauled by wagon. About 1,000 tons are now lying at the furnace, and the teams are at present hauling about 25 tons daily, which amount can be increased whenever necessary. The mine itself is looking splendidly. The two working shafts are now down 120 ft. each, the bottom in 30 ft. wide of fine black ore, which, however, is hard enough to require roasting before it will melt freely. This ore, at a low estimate, carries \$40 per ton in silver, and from 35% to 40% in lead. The diamond drill owned by the company—the only one in the Territory—is doing good work. A core was taken out in one direction for a distance of 250 ft., and it disclosed several fine-looking bodies of ore. It is now headed in another direction. The economy of this method of prospecting a mine is being rapidly made apparent by the work which the San Xavier company are doing.—*Arizona Citizen*.

MESSRS. GODBE, HAMPTON & BIGELOW have purchased the American Flag mill of 20 stamps at Pioche, Nev., and will begin the work of crushing ore. They have also purchased the tailings of the Raymond & Ely mine, which they propose smelting into bullion as soon as the parties can erect smelting works. Mr. Hampton, who has been in Pioche in the interest of the company, left here for Salt Lake Thursday, for the purpose of shipping the machinery, etc., necessary to put up a smelter.

WISEMAN & Co. have leased the South Yuha Water & Mining Co.'s hydraulic mine at Quaker Hill, and will work it this season. John Noyes

Richmond Basin.

This camp is located on an elevated plateau on the west slope of the Apache mountains, a little east of north from Globe, and distant about twelve miles. It is nine miles from the Basin, north, to the nearest point on Salt river where water is plentiful. The summit of the Apache mountains is covered with a growth of pinon, juniper, and other woods, suitable for fuel for steam, coal, etc., and the nearest accessible timber available for mining purposes is found in the Sierra Anchas mountains, distant northwest 20 miles. Two good roads lead to Globe, via Wheatfields and Silver Nugget mill.

What is claimed to be the mother lode is located for 1½ miles, the ledge cropping out boldly the entire length. The West and East Richmond, Mack Morris, La Plata, and Defiance are the principal locations on this vein, the lead coursing east and west, and dipping to the north at an angle of 7° 10'. The width of ledge varies from seven to fifteen ft. at the surface, and increases as depth is attained. The ores are chlorides and sulphurets, the former being found near the surface, and native silver at the water level.

The first location made here was the West Richmond, Feb., 1876. It is now owned by M. A. Baldwin & Co., and a small force, soon to be increased, is at work. One hundred tons of ore have been taken out since purchase, by present company averaging \$100. The greatest depth on lead is 90 ft. There are also two drifts in smaller shafts.

The East Richmond has a shaft 45 ft. with a drift running east on the vein, 65 ft., all in ore of high grade, an average sample of the rock worked in San Francisco going over 400 ozs. The property belongs to Wilder, Riebridge & Co.

The Mack Morris is an incorporated company, stock not listed. The main working shaft is down 200 ft., and cross-cuts at the 100 and 200-ft. levels are now being run. The winze is down on the vein, east of working shaft, 175 ft., showing five ft. of ore which will pulp from 250 to 400 ozs; character of ore, sulphurets and bromides. There are steam hoisting works on the mine.

The La Plata (just sold) adjoins the Mack Morris on the east. At a depth of 82 ft. in the main shaft, water was struck and work suspended for want of proper hoisting apparatus. Good ore is shown here of same general character as in Mack Morris.

The Defiance shows no developments except assessment work. It is owned by Watson & Saunders, formerly of the Silver Era Co.

The accidental breakage of a force pump for the hoiler has caused a temporary suspension in work on the Silver Nugget and a consequent slight delay in the shipment of bullion. A pump has been ordered by telegraph, and is now in transit. In the meantime, one has been borrowed which will be working by next week. The working shaft on this property is down 145 ft. in good ore, with stopes, cross-cuts and levels. At a depth of 130 ft. a well-defined vertical ledge is found, two ft. in width, of very rich ore.

There are many other properties which we did not have time to visit, on which more or less work has been done, among which are the South La Plata, Silver Gulch, Marengo, Gift, Last Chance, Great Eastern, Rifleman, South Silver Nugget, Ocher, Blue Gap, North Richmond, Friday, Helen, Montague and Cora, the latter belonging to G. W. Sharp, and said to be a remarkably promising claim, and now worked for a large sum.

It is prophesied by old residents here, who have shown their faith in the camp by staying with it for years, that this will be the bullion producing section of Globe district.—*Globe Chronicle*.

NEW MINING DISTRICT DISCOVERED.—Some two months ago a small party of prospectors, headed by C. Beck, Esq., started for the Summit region to prospect. The Summit is 65½ miles, and 7,832 ft. above Sonora, a granite country. We have seen specimens of two locations—the "Unknown" and the "Lost Quartz." The "Unknown" was discovered on the 6th, near the Summit, and has been in eight for years, and needed but an experienced eye for conditions and a knowledge of ores to bring it to light. It is on trap belt—of which is the foot-wall; and the hanging wall is supposed to be slate, as judged by the float. The width of the vein is not known—although 10 ft. of vein has been found, with 8-inch gouge on foot-wall. This ore will go about \$300. The "Lost Quartz" is about 3 miles from the above location, 1,000 ft. wide in stratifications, contains silver and lead, and will go about \$150 per ton. Mr. Beck resides in Tolueme—is a graduate of Frieherg, with practical experience in the mines of Hartz mountains. He has confidence that a first-class mining district is located there, and it is the intention to build substantial cabins for winter quarters, and demonstrate its extent by practical work.—*Tuolumne Independent*.

STAR DISTRICT, Utah, is attracting the attention of experts and capitalists. The former invariably report favorably upon the district and the mines, most of which show well, so far as developed. The *Tribune* looks for an unprecedentedly large mining boom in Star district in the future. Aside from the richness of its mines, the juxtaposition of the district to the railroad

THE ENGINEER.

Railroads in New Mexico.

American enterprise seems to have taken hold of the work of providing Mexico with railroads at this right end. The only road of any consequence now operated in Mexico is the line from Vera Cruz to the capital. Of those projected, the most important are probably the Sonora and the Mexican Central. These corporations are organized under the State law of Massachusetts, and are controlled in the interest of the Atchison, Topeka and Santa Fe road. The Sonora road is to meet this line on the Arizona frontier. It represents a subscribed capital of \$1,200,000. The Mexican Central is to connect El Paso to the capital, with branches to the west coast and to Laredo. Work on these lines is pushing rapidly forward, and the material aid which has been extended to them in the shape of land grants and mileage subsidies is said to be sufficient to insure the financial success of the undertakings. A line competing with the Mexican Central has been projected by the Southern Pacific interest, and the San Antonio and Mexican Border Company have another in hand from San Antonio to Laredo. This is important, as it will connect the Rio Grande with the California coast and the railroad system of the United States. Several other roads have been surveyed, and within two or three years we may expect to see a great change wrought in the crippled and impoverished republic south of us. The extension of railroad facilities, the development of commerce, and the introduction of Northern enterprise and capital will lend the thrill of a new life through the Mexican nation. Commerce is the most potent of civilizing agents, and when the work of the railroads is accomplished Mexico will have a stable government and whatever else contributes to the prosperity of a people and the permanence of their institutions. It would seem as if the risk incurred by capital at the outset was great, but there can be no doubt that the work now in hand will ultimately accomplish great good and yield large returns. —*Iron Age*.

THE CAPE COD SHIP CANAL.—A joint committee of the Massachusetts Legislature was appointed early in the spring of 1860 to consider the project of cutting through the Isthmus of Cape Cod, for the purpose of navigation, connecting Buzzard bay with Barnstable bay by a ship canal. The matter was reported favorably, but nothing was done until the last few months, when A. G. Fisher a commission merchant and ship broker, of Boston, became interested in the scheme, and found little difficulty in enlisting New York capital. A company was formed, and \$8,000,000 of capital subscribed, of which sum \$1,500,000 has already been paid in. The contract for building the canal has been given to Adam Driehach and John Cameron, of New Jersey. The proposed route of the canal has already been surveyed and fixed by the engineer in chief, George H. Titcomb. The new company has secured a strip of land 1,000 ft. in width along the whole distance through which the canal is to run. The starting point of the canal will be near the little village of Sandwich, and it is expected that 2,000 men will be put to work immediately. The canal will be $7\frac{1}{2}$ miles long. It will shorten the route between New York and Boston 90 miles, and will secure an in shore route between these cities practicable for such passenger and freight boats as now ply on Long Island sound. It is estimated that there is an average annual loss of 6,000 tons of vessel property, and from 30 to 40 lives caused by ship wrecks, occurring around Cape Cod. The canal will be 141 ft. wide at the top, and 6 ft. wide at the bottom. It will have an average depth of 30 ft.

SAW-MILLS.—The art of preparing timber has been greatly simplified in modern times. The old practice in making boards, was to split up the log with wedges, and, inconvenient as the practice was, it was no easy matter to persuade the world that the thing could be done in any better way. Saw-mills were first used in Europe in the fifteenth century, but so lately as 1555, an English ambassador, having seen a saw-mill in France, thought it a novelty which deserved particular description. It is amusing to note how the aversion of labor-saving machinery has always agitated England. The first saw-mill was established by a Dutchman, in 1663; but the public outcry against the new-fangled machine was so violent, that the proprietor was forced to decamp with greater expedition than ever did Dutchman before. The evil was thus kept out of England for several years, or rather generations, but in 1768, an unlucky timber merchant, hoping that after so long a time the public would be less watchful of its own interests, made a rash attempt to construct another mill. The guardians of the public welfare, however, were on the alert, and a conscientious mob at once collected and pulled the mill to pieces.

It is stated that R. Hoe & Co., the New York press builders, have paid the widow of William Bullock \$2,000,000 for the patents he took out on printing machinery.

USEFUL INFORMATION.

Crushing Strength of Bricks.

The resistance of bricks to a crushing force varies greatly according to the quality of the brick. Trautwine, who has experimented considerably with building materials, says on this point that a rather soft brick will crush under a weight of from 450 to 600 lbs. per square inch, or about 30 to 40 tons per square ft., while a first-rate machine-pressed brick will require from 300 to 400 tons per square ft. This last is about the crushing limit of the best sandstones—two-thirds as much as the best marbles or limestones, and one-half as much as the best granites or roofing slates. But masses of brickwork, he notes, will crush under much smaller loads than single bricks. In some English experiments, referred to by this author, small cubical masses only 9 inches on each edge, laid in cement, crushed under 27 to 40 tons per square ft. Others, with piers 9 inches square and 2 ft. 3 inches high, in cement, only two days after being built, required 44 to 62 tons per square ft. to crush them. Another, of pressed brick, in best Portland cement, is said to have withstood 202 tons per square ft., and with common lime mortar only one-fourth as much. The same authority, however, is careful to add the statement that cracking and splitting usually commence under about one-half the crushing loads. To be safe, he recommends that the load should not exceed one-eighth or one-tenth of the crushing load; and so also with stone. Moreover, he notes, these experiments were made with low masses, but the strength decreases as the proportion of the height to thickness increases. He cites the following examples: The pressure at the base of a brick shot tower in Baltimore, 246 ft. high, is estimated at $6\frac{1}{2}$ tons per square ft.; and in a brick chimney at Glasgow, Scotland, 463 ft. high, at 9 tons. Prof. Rankine calculates that in heavy gale this pressure is increased to 15 tons the leeward side. The walls of both are, of course, much thicker at the bottom than the top. With walls 160 ft. high, of uniform thickness, the pressure at the base would be 5.4 tons per square ft. He prudently concludes that with our present imperfect knowledge on this subject, it cannot be considered safe to expose even first-class pressed brick work, in cement, to more than 12 or 15 tons per square ft., and good hand-molded bricks to more than two-thirds as much. —*Manufacturer and Builder*.

PROPOSED OCEAN TELEPHONE.—A Cincinnati company is negotiating with the cable companies for the lease of a line for eight days for the purpose of testing experiments for telephone communication with Europe. It is believed that the new French line will be secured. The arrangements, it is thought, will be completed in a few days. The process upon which the proposed work is to be done is based upon the Oranrough invention of 1868 and the recent Klenin patents. The tests will be made from New York city. Only the combination of the two systems mentioned will be tested, to the exclusion of the Bell, the Edison, or any of the instruments now in active use, as the new company claim that they are actually infringing.

PROF. BAUSCHINGER has lately tested some iron taken from a chain bridge built in 1829, and found that after 50 years of service its strength and elasticity had not altered perceptibly from what they were reported to be at the time they were put into service. The fact that age has little effect on the quality of iron, is likewise verified by the result of tests made by Prof. Thurston of pieces of wire cable of the historic Fairmount suspension bridge at Philadelphia, lately taken down after 40 years of service. The tested pieces were found to have a tenacity, elasticity and ductility fully equal to the best wire of the same size found in the market to-day.

SALICYLIC ACID.—The preservative and antiseptic action of salicylic acid cannot be relied upon when brought into contact with any liquid substance in wooden vessels or casks. The salicylic acid under these circumstances speedily disappears, being apparently absorbed and decomposed by the wood tissue. When this acid is used as an addition to drinking water or wine, the casks must first be coated with pitch.

WHERE ELEPHANTS GO TO DIE.—The elephant hunters of Ceylon and India corroborate Sindbad's story that elephants, when they feel the approach of death, retire to a solitary and inaccessible valley, and there die in peace. Mr. Sanderson, superintendent of elephants to the government of India, admits that no living man has come across the corpse of a wild elephant that has died a natural death.

THE FIRST engineer of the Rhenish railway, which has the longest experience in steel rails, has made a calculation, according to which the average duration of steel rails, when 24 trains pass over them every day, is 30 years, while that of iron rails, with a traffic of 17 trains, is 11 years. Steel rails, according to this calculation, last four times as long as iron rails, although they are but one-third more expensive.

WELDING HORN.—Pieces of horn may be joined by heating the edges until they are quite soft, and pressing them together until they are cold.

Meat Bread.

An interesting observation which bids fair to receive an extensive practical application, is reported to have been made by M. Scheurer-Kestner. This savant discovered the noteworthy fact that meat, when added to bread, during the process of fermentation, disappears entirely, its nutritive principles being incorporated with the bread. In this condition the meat appears to be capable of being preserved for a lengthened period, as the discoverer above named exhibited to the French Academy specimen loaves of meat bread made several years before, which showed no signs of either worms or moldiness.

In the account given of his experiments, he states that at first he used raw meat, three parts of which, finely minced, he mixed with five parts of flour and the same quantity of yeast. Water was added in sufficient quantity to make a dough of proper consistency, and the mass in due time underwent fermentation. In two or three hours the meat had disappeared, having undergone a species of digestion in the fermenting mass, and the bread was baked as usual. The taste of the meat bread thus prepared was disagreeable and sour, an objection that was subsequently obviated by first cooking the meat for about an hour with enough water to afterwards moisten the flour. The meat used for the purpose should be carefully freed from fat, and only enough salt added to give the necessary flavor, as the addition of too much would, by its property of absorbing atmospheric moisture, spoil the bread. The proportions recommended are one-half of meat to one of flour, in which quantities the meat will be thoroughly incorporated during fermentation. Meat bread, prepared with a suitable quantity of yeast, is asserted to make an excellent, nutritious soup for the sick and wounded.

A FRENCH inventor has devised an ingenious electrical low water signal for steam boilers, which indicates the existing water level at any distance from the generator, and when the water has sunk below a certain point rings a signal bell, while at the same time the sign "low water" appears on the indicating tablet.

HON. W. D. BISHOP, formerly Commissioner of Patents, and more recently President of the New York and New Haven railroad, has a carriage mounted on bicycle wheels with India-rubber tires. The wheels were made by the Pope bicycle manufacturing company, and are of steel, nickel plated.

GOOD HEALTH.

Skin Grafting from a Sheep.

The *Chicago Times*, of September 4th, contained a full account of an operation in skin grafting which was performed at the County hospital. The patient was a young man, 23 years of age, named John Filas. A large cancer had been removed from the outside of his right leg near the hip, and the wound which resulted was about 10 inches long and nearly as wide. Nature was healing it so slowly that it was decided she should be assisted, and wisely, too, as the result shows. A previous operation of a similar nature on little Aggie Sheehy was successful, but the vitality in her wasted frame had become so nearly exhausted that her life went out like the light from a lamp exhausted of oil, but it was no fault of the skin transplantation. Filas' frame was strong, and if the experiment should fail he would be none the worse for it. A flap of skin was cut away from the hip of a young sheep, large enough to cover about two-thirds of the wound. It was sewed fast to the natural skin of the sheep on three sides and left attached to the patient on the fourth side. It was expected that while the circulation of the blood of the sheep would keep the flap alive, it would become attached to the exposed surface of the wound on which it rested, and in time be nourished by the blood of the patient. The flap was kept covered for 24 hours. At the end of that time the dressing was removed, and it was found that the tip of the flap, or two inches of it, had died.

Within a few days it became apparent that the remainder of the flap had become firmly attached, the cutting of it away from the sheep was commenced at once, and clippings were made each day. Finally, the sheep began to waste away, and sheep and patient both became very restless. It was thought best to detach the flap from the sheep wholly, and one stroke of the surgeon's knife on yesterday liberated the animal. It is assured that the skin will grow to the man's hip, although some portions of it may yet slough away. If a piece no larger than a silver dollar is finally attached, the fact is settled that skin grafting may be a success. It was not expected at first that less than three operations would be sufficient to supply the patient with all the skin he needed. As soon as the portion now transferred is properly fixed another operation will follow.

PHYSICAL EDUCATION.—Absolute health is only attained when the body is equally developed in all its organs and members. The man with muscles of steel and a diseased heart cannot be said to be in good health, and diseases of stomach, heart and nervous system are often— it may even be said usually—produced by that system of development known as training. At a recent rowing match in Philadelphia, two

plucky lads in contesting boats fainted as soon as the race was over. Their condition, which was apparently good, was actually abnormal, and their systems gave way because the strain which their muscles met was too great for their vital functions. Recently a similar but more serious calamity occurred at Sag Harbor. A Brooklyn lad, who had taken part in a pedestrian contest, when removed from the track, fell down dead. He had prepared himself for walking and running, and depleted his vital organs to build up his limbs. When the strain came, the impoverished and most important part gave way. The severe muscular exercise of college athletes has carried off many fine young men by consumption, heart disease and other disorders, directly traceable to the absurd overwork required of their bodies. There is a limit of human endurance. That limit is reached when the body is impaired in one quarter to benefit special organs. The severity of the test by which athlete prizes are won seems designed rather to award the laurels to him who is least healthy, because more unevenly developed, than to the really best man. —*Brooklyn Eagle*.

DANGER FROM VULCANITE PLATES IN DENTISTRY.—In a recent paper in the *American Journal of Medical Sciences*, Dr. Sexton states that vulcanite plates (worn in the mouth) produce diseases that are often the source of reflex auricular disease. These plates have been in use over twenty years, and are largely adopted. The constituents are caoutchouc, the sulphur required in the vulcanizing process, and vermilion or sulphide of mercury, used as coloring matter. The gradual disintegration of the plate in the mouth liberates a salt of mercury, whose poisonous effects are well known. And the plates are otherwise injurious. At least one-third of all those who attempt to wear them experience great irritation of the mouth, often accompanied by hypersecretion of saliva. The sufferer usually lays aside the plate till informed of the necessity of growing accustomed to its presence by uninterrupted use. Vulcanite is a non-conductor of heat, and the effect of its contact with the highly sensitive tissues of the mouth is to produce hyperemia and inflammation. Another source of injury is the very close contact of these plates, which is maintained by atmospheric pressure, and may favor the absorption of their substance.

PAIN IN ANIMALS.—Prof. J. Rymer Jones is authority for the statement that crustaceans and certain other animals are not susceptible to pain. He says, in a paper on this subject:—"Pain, 'Nature's kind harbingers of mischief,' is only inflicted for wise and important purposes—either to give warning of the existence of disease, or as a powerful stimulus prompting to escape from danger. Acute perceptions of pain could scarcely, therefore, be supposed to exist in animals deprived of all power of remedying the one or of avoiding the other. In man, the power of feeling pain is indubitably placed in the brain; and if communication be cut off between this organ and any part of the body, pain is no longer felt, whatever mutilations may be inflicted. The perception of pain depends upon the development of the encephalic masses; and, consequently, that as this part of the nervous system becomes more perfect, the power of feeling painful impressions increases in the same ratio; or, in other words, that inasmuch as the strength, activity and intelligence of an animal, by which it can escape from pain, depends upon the perfection of the brain, so does the perception of torture depend upon the condition of the same organ."

IS IT SO?—A foreign scientific journal remarks, as a curious physiological fact, that, although open-air life is so favorable to health, yet it has the apparent effect of stunting the growth in early years. Thus, while the children of well-to-do parents, carefully housed and tended, are found to be taller for their age than the children of the poor, they are not so strong in after years. The laborer's children, for instance, who play in the lonely country roads and fields all day, whose parents lock their humble doors when leaving for work in the morning, so that their offspring shall not gain entrance and do mischief, are almost invariably short for their age; the children of working farmers exhibit the same peculiarity. After 16 or 18—after years of hesitation, as it were—the lads shoot up, and become great, hulking, broad fellows, possessed of immense strength. According to these statements, it would seem, that in-door life forces growth at the wrong period, and thus injures. Is it so?

A READY POISON REMEDY.—If a person swallows any poison whatever, or has fallen into convulsions from having over-loaded the stomach, an instantaneous remedy, most efficient, and applicable in a large number of cases, is a heaping teaspoonful of common salt, and as much ground mustard, stirred rapidly in a teaspoonful of water, warm or cold, and swallowed instantly. It is scarcely down before it begins to come up, bringing with it the remaining contents of the stomach; and lest there be any remnant of the poison, however small, let the white of an egg or a teaspoonful of strong coffee be swallowed as soon as the stomach is quiet; because these very common articles nullify a large number of virulent poisons. —*Medical Brief*.

AN EMETIC FOR INFANTS.—A correspondent of the *British Medical Journal* states it as his experience that half a teaspoonful of glycerine acts as a simple and efficient emetic for infants.



B. EWER.....SENIOR EDITOR.

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O. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 9, 1880

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The Week.

The week has been one filled with promises of rain, but promises unfulfilled as yet. The signs of the approaching winter have hastened operations in those quarters where winter supplies are to be laid in. The prospectors are coming in from the hills to take a rest till next season. Hydraulic operations are light just now, water everywhere being low. For several weeks past repairs on ditches, etc., have been going on, to prepare them for the winter rains.

The mining news from various parts of the coast indicate continued prosperity and increased vigor in the prosecution of work. New discoveries are everywhere being made, and reduction facilities in the different camps are being increased.

There is no special news in connection with mining matters to which we can refer. The local interior papers are just now very much taken up with political matters, and many of them are more apt to give us their views on national questions than on local affairs.

A REWARD of £1,000 is offered for the apprehension of the murderers of Lord Mountmorris in Ireland.

THE Natoma water and mining company have declared a quarterly dividend of \$1.50 per share, payable on the 5th.

THE Silver King mine made a shipment of 31,000 lbs. concentrations on the 3d.

It is estimated that there are piled up in and around Bodie 100,000 cords of wood.

It is stated that most of the Skagit river mines are abandoned.

The Top-heavy System of Mining.

It is by no means an uncommon thing for mining managements, in an honest endeavor to reduce expenses to a minimum and to see that all outlay of money is made for the best interests of the stockholders, to begin at the wrong end. This is especially true of Eastern organizations engaged in mining in the Pacific States and Territories; and particularly in cases where the supervision is in charge of men sent out from the East. Such companies have a way of cutting down wages to a point where bad feeling is engendered between employees and the managements, and as a natural consequence the work, done in a half-hearted manner, cannot be expected to be as effective as it should; while, at the same time, large sums are expended without murmur in elegant home offices, in high salaries to unnecessary officials, and in costly experiments with new processes and untried machinery which fail when the test of actual practice is applied. There are a large number of Eastern mining incorporations whose office and salary accounts are far in excess of the mine expenditures. Comfortable berths are made for the "promoters" and their friends, while the mine, which after all should be considered the head and not the tail of the enterprise, is expected to take care of itself and to be steadily productive without expense in development.

Hers is a case in point: An Eastern company, operating a large and well-known mining property on this coast, having made unsuccessful attempts to cut down underground wages to a starvation point, managed to effect a general reduction in surface labor. This was all very well, but was carried to such an extreme that efficient men, who could do better elsewhere, could not be hired to work under the new scale of wages. A new engineer was put on the night shift at \$3 per shift of 12 hours—the previous prices had been \$5. The mine was raising water. For three nights all went well; but the fourth night under the new system the engineer lost control of his engine, let her overwind, carried away sheaves, gallowes-frame, etc., and demolished a good part of the roof of the hoisting works. Result: A net saving of \$8, and repairs to the amount of \$1,500. Now it might very easily happen that a \$5-engineer should have met with just as bad luck as a \$3 one, it may be said. Perhaps so; but still, if we were to be hoisted up and lowered down a deep shaft four times a day, we would be inclined to vote for the more expensive man at the lever and brake. The case quoted is an extreme one; but is it without parallel?

A company working a mine on a small scale, say with 10 men, pays \$3.50 per day to each. Instructions from a \$5,000-president in his comfortable \$2,000-office in New York, direct, through a \$2,500-secretary, that the superintendent shall reduce underground wages to \$3 per shift. This secures the magnificent saving of \$5 per day to the company, and shareholders are correspondingly charmed with the economical and business-like management which aims to work the mine on proper, sensible figures.

Again, another Eastern company, having bought a good little mine at a good round figure, devotes \$50,000 as a working capital, to be used in placing the mine in a dividend-paying shape. How is this result sought to be reached? Why, by voting \$11,000 in salaries per year and in ordering a fine and expensive mill, big enough to keep a dozen equally good little mines busy in supplying it with ore. The mill is put up in winter in an arctic climate, with heavy freight charges and under great disadvantages, so anxious is the management to return early dividends to the stockholders. By the time the mill is completed it is found that the working capital is exhausted, that the mine is not in shape to keep a single battery steadily running, and that the accounts are behind hand. Naturally enough, the stockholders, who had confidently looked for a far different state of things, feel reluctant to advance more money, and the whole thing comes to a standstill. Is this the only instance of the kind?

One more case: An Eastern incorporation purchases water rights and gravel claims in Dakota Territory. It is proposed to build a 25-mile flume to develop some wonderfully rich placers, which no one but those interested in the sale know anything about. Economy and sound business principles are to be the rule. Mining expense are to be brought down to a minimum. The construction estimates are carefully scrutinized. Iron piping is to be laid down, 400 miles from the railroad, at New York figures. So much a foot for embankments, so much for ditches, so much for fluming, so much for supplies—no more. Electric lights are to be substituted for keroene or torches for economy. Meanwhile the company raises \$250,000 for the prosecution of this laudable scheme. The president receives a high salary, in requital of which he gets his friends to buy stock; the secretary a satisfactory one, and brokerage commissions are made in due ratio. Now for the outcome of it all. The figures are found to be doctored, the appliances contracted for to have been furnished by inside "promoters," and the whole thing a mistake. A defalcation takes place to add interest to the situation. Is it remarkable that this particular set of stockholders should become disgusted, and believe that even with economy and careful management mining does not pay?

The mining country, the older portion of it, is strewn with wrecks marking similar mismanagement. In many cases, perhaps in most, economy was practiced in the small things and neglected in the greater. The result is that a great number of valuable mines which might have been made profitable are lying idle, and to-day expensive mills and hoisting works are rusting into old iron, silent reminders of what may be termed the top-heavy system of mining. And then the blame is placed on the mines, where it most assuredly does not belong, and the whole industry, which is just as legitimate and as much a business as any other, is made to suffer because of inefficiency and downright swindling in certain hands.

Mining does pay. The proof is tangible.

Bogus Mines.

Of course while there are so many mining companies being organized and put on the market in the Eastern cities, an opportunity is given for setting up fraudulent concerns also. All sorts of dodges are practiced to get money out of a too confiding public, and no propositions are too absurd to find some dupes. Even in California, where we ought to know better, people are found who will help out a man who is going to get gold out of water, and even after they are told how the gold is first put in. The cheekiest attempt we have heard of in a long time, however, is one lately made in New York. *The Graphic*, of that city, on Sept. 22d contained the following item: "The noted London mine is to be opened by Mackay and Fair. The mine was stocked at \$10,000,000, of which \$3,000,000 was voted by the company. Of the balance Mackay and Fair took two-thirds, paying \$184,000 down. A part of this sum was used to pay the floating debt, and \$100,000 was placed in the treasury. A new 20-stamp mill has been ordered, and a force of 140 experienced miners is to be set at work."

The ingenious inventor of the "London mine" took the largest figures he could conveniently use, and the names of the richest and most successful mining men he could find. In this he rather overreached himself. The Virginia Enterprise representative interviewed both Col. J. G. Fair and John W. Mackay, and is authorized to say that there is not a word of truth in their having invested in the London mine; that they do not know where the mine is situated (supposing it to have an existence), and never before heard of it.

The Marin County Mining Failure.

The mining enterprises in Marin county, which made such a stir last January, did not pan out as well as the promoters hoped, but they did as much as we expected and predicted. The San Geronimo mine, with engine, tools and hoisting works, was sold at auction last week under a judgment, the company making no effort to redeem the property.

It will be remembered that work was started in these mines on the strength of "vapor assays" made by a would-be expert of this city, who got more out by his vapor assay than a fire assay showed to be in the rock. Fire assays proved the ore barren, but the vapor assays proved it to average \$65 per ton. Reliable assayers tested the ore by the new method, but found nothing in it at all. The rock was said to be "green," not fully formed, and carrying the metal partly in a "liquid state." A peculiar process was needed to work the ore, also.

In fact the whole thing was one of those foolish speculations which people sometimes go into. The rock was "green," and the people, too. The profits are found in "vapors," the same as the assays found the gold. The only wonder is that so many could be found to put up money for machinery to carry out so very foolish a proposition.

FIRE IN LEADVILLE MINES.—A special to the *Denver Republican*, dated the 5th, says that a fire started at five o'clock in the shaft house of the old Vulcan shaft in the Chrysolite mine, caused by a sick miner dropping a candle. The building was consumed and the burning debris fell into the shaft setting it on fire. The Vulcan connects with the Chrysolite, Little Chief, Amie, Climax and Little Pittsburg mines by levels at a depth of 120 ft., all of which were filled with carbonic acid gas and smoke, driving the men from the work of constructing bulkheads, and 600 ft. away 12 men were overcome by smoke, and barely saved their lives. After great trouble, bulkheads were built, preventing the fire from spreading, and the flames are now confined to a radius of 30 ft. from the Vulcan shaft, and are completely under control. All the shafts are hermetically closed, to exclude drafts, and will remain so for four days. Work will be suspended on all mines for a week and perhaps longer. Nobody is seriously hurt. The damage is about \$20,000, caused by delay of work. All the levels and drifts are full of gas.

An old miner named Charles Brown committed suicide on September 23d on Birdseye creek, Jackson county, Or. He took a good smoke and then blew his brains out with a rifle. He had been engaged in mining for 13 years in that county.

"Reasonable Diligence" in Mining Suits.

The Commissioner of the General Land Office has, in a recent decision, settled that the provisions of the mining law for the adjudication of adverse claims in the courts does not contemplate that the sale of the public mineral land shall be indefinitely postponed upon the simple filing of a complaint. The adverse claim must be prosecuted with due diligence. This decision is given in full in Copp's "Land Owner," from which it is seen that P. J. Lonergan and others filed an adverse claim, against a patent for the Mammoth lods in Colorado, applied for by H. H. Eddy. They filed a complaint in February, 1880, but up to June had issued no summons.

Section 2326 U. S. Revised Statutes provides, "it shall be the duty of the adverse claimant within 30 days after filing his claim, to commence proceedings in a court of competent jurisdiction, to determine the question of the right of possession, and prosecute the same with reasonable diligence, and a failure to do shall be a waiver of his adverse claim." Upon the commencement of such proceedings, all actions in the local offices must be stayed until the controversy has been settled or decided by a court of competent jurisdiction, or the adverse claim waived.

A petition was made to dismiss the adverse claim on the ground that the adverse claimants failed to prosecute their suit with "reasonable diligence" as required by this statute. The Commissioner was of opinion that the negligence in this instance was positive; but it was also clear that the adverse claimants had not commenced their suit in the manner contemplated by the statute. Until a summons is issued the court acquires no jurisdiction over the subject matter in controversy. The law contemplates that the sale of the public lands shall not be delayed by controversies of this character for a longer period than is necessary for the proper legal adjudication of the disputes. In some States the summons may issue at any time after the filing of the complaint. In California, it may issue at any time within one year.

To hold that by the simple filing of a complaint, without having summons issued, an adverse claimant may indefinitely postpone the sale of the public mineral lands, was never contemplated.

The Commissioner says: I therefore allow the motion of the counsel, and dismiss the adverse claim of Lonergan *et al.*, on the several grounds that they have not proceeded with due diligence, and have not commenced their action in the manner contemplated by the law.

ROBERTSON'S PROCESS.—New York *Truth*, of the 23d ult., says: "The controlling interest of the Robertson electric ore reduction company has been sold to Joseph P. Hale, the well-known piano manufacturer, and associates. The price is not stated, but is reported at figures ranging from \$250,000 to \$500,000. At a meeting of the company, held at No. 58 Broadway, yesterday, the following changes were made in the management of the company: Jas. P. Hale was elected President and Director in place of Vernon Seaman, resigned; Henry L. Chandler was elected Secretary and Director, in place of Lindley F. Seaman, resigned; Messrs. William F. Clewell and Theodore Williams resigned their directorships, and Messrs. Charles H. Stone and B. C. Jackson were elected to fill the vacancies; Mr. John A. Robertson continues in his position as director and general superintendent of the company." The New York *Weekly Mining News* says of Robertson: "During his stay in the city, Capt. Robertson succeeded, through the efforts of Mr. Vernon Seaman, in disposing of the controlling interest in his invention, and he returns to the Pacific richer by something over \$100,000 than he was when he came here." Those who know anything about Mr. Robertson's process or the patent under which he holds it, will think he was very lucky to sell at such figures, to say the least. The process has never worked satisfactorily here that we can find, although there was a great deal of talk about it at one time. There are no new principles involved in the process at all, as the New York purchasers will no doubt find when they investigate what the Patent Office calls the "state of the art."

DEATH IN THE BELCHER.—When T. J. Knuckey went to the 3000 level of Belcher on Tuesday morning to relieve his father, Thomae Knuckey, who was running a donkey pump there, he found the old man just above the station in the incline, and overcame with the heat. The young man was alone, and was compelled to go for help or he overcome himself. When he returned his father was dead.

We see by the Nevada City *Transcript*, that during the month of September, various mining companies in that neighborhood shipped to the bay, through Wells, Fargo & Co's office, at that city, the sum of \$134,600. This sum is about \$2,000 more than was shipped during August of this year, and \$50,000 more than in the month of September, 1879.

The shipments by the Seattle (W. T.) Coal Company during September amounted to 11,333 tons, and since January 1st 98, 262 tons.

A Wonderful Ruin in Arizona.

Many have heard of Casa Grande, and have read detailed descriptions of it, and the impressions of travelers upon viewing it. It is certainly one of the most interesting and important vestiges of an earlier civilization upon this coast, and we have thought our readers would like to see a view of the exterior of the structure with some notes concerning its internal construction and arrangement. This view of the exterior is taken from Conklin's "Picturesque Arizona," published by the Continent Stereoscopic Co., of New York. The description of the ruin and the diagrams accompanying it we condense from an article prepared for the *Californian* by Henry G. Hanks, of this city.

The ancient building known as Casa Grande, on the banks of the Gila river, is at this present time the most interesting of all the ruins left by the prehistoric people. Although there are many other ruins of less note which are worthy of careful study, this one is the best known, and is identified with the history of the country. The first mention of Casa Grande is in the account of the explorations of Colorado in 1550. Coronado came northward from Mexico to search out the grand buildings which were reported to exist in the region he explored. The Casa Grande was then a ruin, and the explorer was much chagrined at finding it instead of the golden splendors promised him. Another account describes a visit of Father Kino to the ruin in 1694, and he found traditions among the Indians that the ruin was then 400 years old. Other accounts by visiting priests contain testimony from the Indians which led the explorers to conclude that Casa Grande was built in the 13th century. Later, however, the Indians were closely examined as to the truth of their traditions, and they admitted that they in truth knew nothing of the origin of the building, but that all was wrapped in mystery.

Mr. Hanks, in company with Prof. George H. Cook, State Geologist of New Jersey, and S. P. Van Winkle, also of New Jersey, visited Casa Grande in April, 1879. This remarkable ruin lies about 12 miles from the flourishing town of Florence, Pinal county, Arizona. It stands on a wide-spreading mesa, rising slightly from the main road. The mesquite trees, although low, hide the building until it is nearly approached. For miles distant from the ruin the ground is spread with fragments of broken pottery, in such quantities that it is impossible to reject the idea that the site was at one time densely populated, where now utter desolation reigns. It is natural, under such circumstances, to speculate as to how the people lived; for, if the country was in the same state then as now, the question would be a difficult one to answer. The visitor has ample time to think the matter over from the time he first begins to observe the signs of human habitation until he reaches the building. With our party the conclusion reached was that the Colorado desert may have been once an inland sea, and the climate widely different from the present.

As the traveler approaches Casa Grande he cannot fail to be somewhat disappointed, the more so if he has taken a romantic or poetical view of the published descriptions of that noted building. Instead of the stately edifice he has pictured in his imagination, he beholds only a huge dun colored, almost shapeless mass, looming up strangely from the desolate plain. There is nothing architectural about the structure. It is, at best, but a mud house; though, as he examines it more closely, it seems more and more wonderful, and the mind is filled with conjecture as to the race to which this great building may have been put, and why it stands so lonely and isolated.

The diagram, Fig. 1, upon this page is the ground plan of Casa Grande, on a scale of 20 ft. to the inch. The walls were originally, as near as may be, four ft. in thickness, the exact measurement being three and seven-tenths ft. The highest point, as the building now stands, is 35 ft. It was originally four or five stories high, each of which was eight ft. from floor to ceiling. The extreme length, carefully measured, is 58½ ft., and the width 43 ft. In the north, south, east and west faces of the building there were narrow doors, centrally placed, through which entrance was made into the main compartments, and over each door narrow port holes, decreasing in width from the bottom upward. The diagram, Fig. 2, gives the form of them, drawn to a scale of half an inch to the foot.

The building faces nearly the cardinal points of the compass, the north and south walls bearing north, ten degrees east, which is nearly the true meridian. The interior must have been dark, as the light was admitted only through the before described port-holes. The inner room was, presumably, like a dungeon. The central series of rooms was at least one story higher than the others. From A into E (Fig. 1) there is a port-hole in the second story, from room to room. From E into D there was originally a port-hole of the same size, but it has been filled in. From E to C there is a door, but none from C into B, instead of which there are several circular openings, from eight to ten inches in diameter, extending through the thick

walls and resembling modern stove-pipe holes. They are still perfectly smooth on the inside. What use these singular openings were put to can only be conjectured. Concerning the present condition of this wonderful ruin, Mr. Hanks observes, that the inner surface has remained these long years intact, the smooth face showing no sign of decay. The little wrinkled marks, left when the surface dried, remain the same as when, centuries ago, the builder laid aside his tools, and the work was declared finished. Readers of works written by travelers in Egypt wonder at the accounts given of temple and tomb, whose pictured walls remain as fresh as if newly painted. They are inclined to think, if at all skeptical, that these statements are exaggerated. Yet here in Arizona we have evidences that, in the warm, dry climate, changes take place slowly. It is not easy to understand why the concrete walls should not last a thousand years as well as a hundred. Some parts of the outer surfaces remain as smooth as when left by the builder, while in others the



EXTERIOR VIEW OF CASA GRANDE IN ARIZONA.

tooth of time has gnawed snail-like cavities, like cancer spots. Why this should be the case has caused the writer much thought. For centuries occasional rain storms, and the continued action of the natural sand-blast, have gradually worn away the surfaces, and left their records on the old dun-colored walls. We are apt to

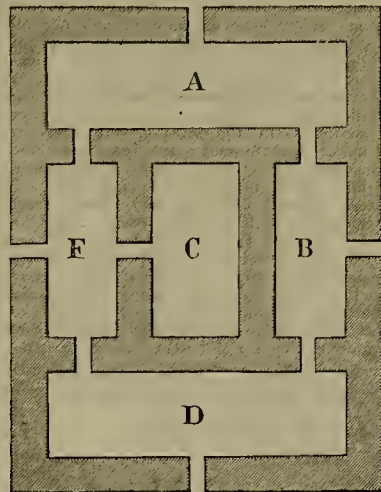


Fig. 1. Ground Plan.

overlook the importance of little things, and may forget that an incessant bombardment, lasting for centuries, may produce great changes, even if the missiles be only grains of sand.

THE Barbee & Walker mining company of Utah paid a dividend of 10 cents per share in New York on the 25th. This makes \$40,000 paid to stockholders. An old and well known Californian, Richard L. Ogden, is resident director at this mine, and exercises a personal supervision over its affairs. The result of his business management is satisfactory, as the figures prove.

POSTMASTER MAYNARD decided Saturday not to suspend the recent order of the Post Office Department forbidding the delivery of registered letters and postal orders to the Kentucky Lottery Company. He declines to reverse the past action of the Department, at least until the United States Supreme Court shall have disposed of the lottery question which is now before it.

THE September product of the California mine was \$92,110.

Silk and Wool Conditioning.

A silk and wool conditioning works has been established in New York city, the first in the United States, although there is in Europe a conditioning house at every large center of silk or wool trade and manufacture.

The "conditioning" consists in drying a definite quantity of silk or wool, by which the net weight of a lot of silk or wool contained in a bale can be obtained, in deducting all over weight for moisture, exceeding 11% for silk, 17% for combed and 18½% for carded wool. These fractions of moisture are those settled on by the Congress of Turin.

The decreaseage is the chemical process or analysis by which the exact percentage of over-weight (gum, grease, etc.) contained in raw silk or wool can be obtained.

Importers or dealers send the bales to be

tested to the conditioning house, with the marks, numbers and weights on a memorandum, and also the name of person to whom the bales are to be delivered. Each bale or part of a bale, after being "conditioned," is provided with a cord or rope, the extremity of which is sealed with a leaden stamp bearing the mark of the

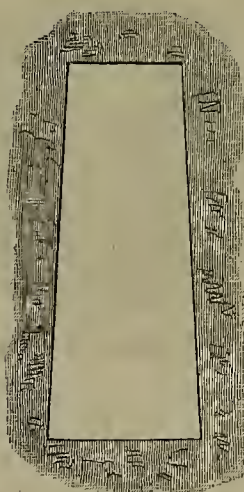


Fig. 2. Porthole.

conditioning house, which is a guarantee of the net conditioned weight, and duly recorded in a certificate sent to seller and buyer. The charge is two cents a pound for any quantity over 50 pounds, and on any quantity less than that \$1 is charged. The certificates of the conditioning establishments of Lyons are recognized for exactitude and fairness, and it is hoped that the new works will obtain similar recognition. The apparatus, scales, etc., have been manufactured specially for this work, and are of the greatest precision.

It is stated that rich lodes of tin have been discovered in Mason and King counties, in Washington Ter. When we hear of some block tin being made we shall believe it. Tin discoveries have been made by the hundreds during the past 10 years, but none of them ever panned out anything yet. We hope this one will.

A DIVIDEND of \$25,000 was paid by the Excelsior water and gravel mining company of Yuba county, California, at New York, Tuesday.

Jupiter's Satellites.

At the last meeting of the California Academy of Sciences a communication was read from Prof. George Davidson, President of the Academy, on the "Visibility of Jupiter's Satellites to the Naked Eye." He says: The seeing of Jupiter's satellites with the unassisted eye is so rare an occurrence, that I wish to place upon record a recent unmistakable case. From the station Monticello, of the United States Coast and Geodetic Survey, 3,125 ft. above the sea, we overlook Berryessa valley on the west and the Sacramento valley on the east. The station is on the highest point of a sharp ridge, trending generally north and south, with many deep gulches on either side. For nearly a month the Sacramento and Coast Range valleys have been filled with dense smoke, and the distant mountain ranges have all been hidden. Even the bold, dark, grand mass of Mt. Helena, distant but 24 miles, was hardly visible through the thick atmosphere. The upper limit of the smoke stratum was quite sharply defined to the eastward; above it the sky was generally clear, but upon the present occasion only moderately so. The weather for some time had been warm and pleasant, without clouds or wind. On the early evening of Monday, September 20th, we were looking at the obscured moon struggling through the dense smoke; Jupiter, at an estimated elevation of about 8 degrees, was emerging from it, and for an elevation of 25 to 30 degrees the whole sky was hazy, and stars of the fifth magnitude, and even some of the larger ones, were not visible to the naked eye. There was not the least radiation to Jupiter, and the planet rose through the smoky but quiet atmosphere into the thinner smoke or haze without radiant points of light to blur its appearance.

With the unassisted eye Professor Davidson detected the third satellite of Jupiter, to the left and below the disc of the planet; but, lest he might be mistaken, he refrained from calling attention to it for some minutes, until there could be no possible mistake, when he announced the visibility of a satellite, but without stating its position in relation to the primary. All the officers immediately announced its visibility and position, but naturally wondered why it should be seen so unmistakably through such a thick, hazy atmosphere. A binocular, or good field-glass, with magnifying power of seven diameters, revealed it, and also showed the other satellites on the sides of the planet, but revealing the first and second satellites with difficulty, until the planet had risen somewhat higher. The third satellite continued visible to the naked eye for perhaps twenty minutes, when the moon rose above the smoke stratum, and the planet began to exhibit traces of radiation, when the satellite was lost to the naked eye, although all the satellites had become much brighter than before in the field of binocular. Upon subsequent nights, after the smoke had in great measure been blown away, with a remarkably clear sky and no moon, but with great radiation to the planet, no satellites have been surely made out with the unassisted vision. The observers who distinctly saw the satellites were Messrs. Lawson, Gilbert and Buckland and also Mrs. Davidson. I have before reported one or more cases of my seeing a satellite of Jupiter, notably once on Mount Diablo in 1876.

Bullion Shipments.*

Since our last issue, we have noticed the following bullion shipments:

Northern Belle, Sept. 27, \$9,493.94; Standard, Sept. 27, \$26,634.51; Northern Belle, Sept. 29, \$4,389.85; Christy, Sept. 30, \$8,136; Argenta, Oct. 4, \$2,100; Standard Con., Oct. 4, \$50,624.93. Con. Virginia for month of Sept., \$82,225. California, Oct. 3, \$64,000. Bodie Con. for Sept., \$26,060; Standard Con. for Sept., \$130,432; Noonday for Sept., \$27,895; North Noonday for Sept., \$18,333; Belvidere for Sept., \$13,882; Dudley for Sept., \$1,746. Tiptop (Arizona), Oct. 5, \$30,000; Richmond Con., Oct. 2, \$23,086.

*Desiring to make our list of Bullion Shipments as complete as possible, we will be thankful to receive from mining Superintendents and Secretaries notice of all bullion shipments from their respective mines.

THE California mine yielded 109 tons ore last week, assaying \$21.60 per ton. A shipment of \$64,000 in bullion was made on the 3d, and there is \$28,110 more at the Virginia office.

WORK in the north branch of the Sutor tunnel has been abandoned on account of a difficulty with the managers of the north end mines.

THE Consolidated Virginia mine produced 936 tons of ore last week, assaying \$27.76 per ton, and has \$17,166 in bullion at the Virginia office.

BUT one mining location has been recorded in Bodie district, during September, and that one an underground location in the Bodie

Bingham Pyrites.

"There is not a mine in Bingham sinking," said a miner from that camp to our reporter yesterday. That means much to a miner. There is no prospecting ahead for ore reserves; no attempt to determine the question so important to Bingham's future, viz; the condition of the ledges below the pyrites.

In 1872 the old Utah company tried to sink a shaft, and quit because the water encountered could not be baled out with a bucket. The Winnamuck, under the management of Pinedo, started a shaft later, and for some cause not yet explained, work was suspended and the machinery sold.

The Last Chance, after wrestling with insufficient machinery and the Flagstaff muddle, quit sinking at a depth of 200 feet from the tunnel level, although there was ore, good ore, at the bottom of the shaft.

While the Spanish mine was turning out its millions from a ledge seventy-five feet wide, there was no attempt made to go below the water level, and it remains to-day high and dry—a wreck.

Men begin to realize now what is required to keep a paying mine on a paying basis. The sod turned last spring will not do for next year's crop, and the miner who does not keep his ground cultivated ahead of his work will come out at the diminutive end of the horn. It is only a question of time, unless new levels are opened up, when the upper workings are all stopped out and the mine then, as the Bingham mines are said to be, worked out.

It is well known that in order to handle the water encountered in sinking, a single compartment shaft is worthless. And yet in view of the many failures of those who undertook to accomplish anything with such shafts, the Bingham miners still persist in the same folly. While the money thus wasted comes, perhaps, from the pockets of those who can afford it, yet every failure affects the interests of all. The successful sinking of one deep shaft in Bingham would enhance the value of every mine in that camp. It would not only do that, but also give employment to several thousand miners.

There is not a practical miner in Utah who is not satisfied that below the pyrites is good ore. European miners have proved this, and American smoke indicates fire the same as smoke does the world over.

With a railroad connecting the camp with the outside world, a tramway running by the dumps of nearly all the mines, the mines in the hands of wealthy owners and the best talent in the country to draw from, there is no sense or reason for Bingham's nonproductiveness.

The Last Chance has passed into the hands of the old company, and with the encouraging look in that company's shaft, we would not be at all surprised if the solution of Bingham's future does not come from that quarter.—*Salt Lake Tribune.*

Paradise and Willow Creek Mines.

Mr. Stanley a practical mining man from Virginia City is visiting the Paradise and Willow Creek mines. He is not a capitalist, and does not desire either to hold or purchase, but is simply looking for a suitable location to put his 10-stamp quartz mill. He would, if desirable, consolidate his mill with any good prospect promising an adequate return for the venture, and owners of such claims would do well to make his acquaintance. In the extensive mineral belt that skirts Paradise valley, there are many ledges carrying low grade ores in abundance, and where the water and fuel privileges are second to none in the State. Some of these ledges are of huge proportions, but owing to the character of the ore, they have not been extensively worked by prospectors, who as a rule confine their operations to ores that will pay to ship. Experience teaches us that these low grade ore bodies are the most permanent; and the time will doubtless come, when the attention of capitalists will be turned toward developing them instead of the big things which almost invariably prove "big bills" in the end, as in the Colorado and other places. The poor prospector, however, must look for something rich on top, and leave the development of low grade ledges to capital. His scanty means are insufficient to meet the expense attending any extensive development, where the ore is not rich enough to market, and consequently our mammoth low grade ledges, with the vast treasure contained in their depths, are undisturbed. We can recommend Mr. Stanley to our mining men, as a man who has had large experience in the working of ores, and a gentleman in whom the utmost confidence may be placed with safety.—*Paradise Reporter.*

BEAVER CREEK DISTRICT.—The work done in this district during the summer has been considerable. Messrs. Graham, Jones, Fiddler, McIlvain and Heiherger have been the principal workers. The latter has a good prospect known as the Bull-Domingo. The workmen have sunk the shaft to the depth of 60 ft. and have struck a vein of gold-bearing rock that assays three ounces to the ton. With the striking of the vein came a flow of water that effectually drove the workmen out. Mr. Heiherger does not intend to let the matter rest there, and has purchased a hoiler and ejector, and will pump the water out so as to continue development on what may prove a very valuable property.—*Fairplay Plume.*

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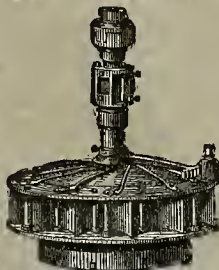
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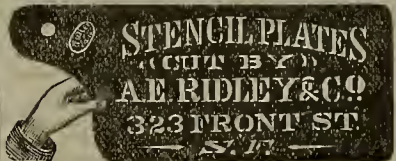
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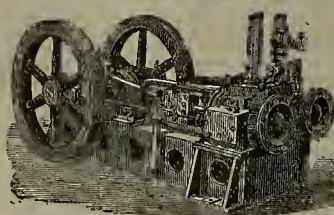
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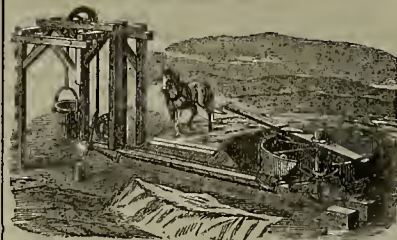
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Believing that a Journal of the kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, E. H. Williams, Thos. J. Wells, F. Huera, John Marcus, B. McDougal & Son, Wm. Moser, Wm. Curlett, Meeker & Banks, W. O. Hoagland, S. & J. Newsom, B. Hendrickson

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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING SEPTEMBER 21st, 1880.
232,441.—ATTACHMENT FOR WAGONS.—O. W. Blake, Port Townsend, W. T.
232,336.—CARPET Lining.—E. K. Cooley, Antioch, Cal.
232,339.—MACHINE FOR FILING CANS.—L. Cutting, S. F.
232,495.—COUPLING.—D. D. Hayes, S. F.
232,520.—PUMP.—A. H. Lighthall, S. F.
232,360.—TELEGRAPH POLE.—W. H. Milliken, S. F.
232,364.—ORE GRINDING MILL.—A. B. Paul, S. F.
232,417.—TARGET.—R. H. Savage, S. F.
232,381.—EXPLOSIVE COMPOUND.—Max Tshirner, S. F.

FOR THE WEEK ENDING SEPTEMBER 23rd, 1880.
232,596.—COIN COUNTER.—P. Clark, Milpitas, Cal.
232,640.—BLASTING.—R. F. L. Hallock, Vallecito, Cal.
232,641.—HARROW.—S. Harris, S. F.
232,608.—ATTACHMENT FOR ELEVATORS.—P. Hinkley, S. F.
232,719.—FARE BOX.—O. W. Horne, S. F.
232,763.—SAMBLE HORN.—O. Rubeats and J. J. Durbille, Albany, Oregon.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors, transacted with perfect security and in the shortest possible time.

Columbus Mining District, Nevada.

[From our Travelling Correspondent.]

EDITORS PRESS:—The mines here are confined mainly to one great mineral zone, nearly 10 miles in length with an average, perhaps, of half a mile in width. Its general course, easterly and westerly; the interlying ore veins taking a similar strike with a dip to the north. Formation, a porphyritic clay slate, in places more or less elicitified and grading off into quartzite.

A few mines are opened in the vicinity of Columbus. The principal operations are near the west end of the belt, where are found nearly 1,000 inhabitants, chiefly in Metallic City and Candelaria—two thriving villages scarcely a mile apart.

The lithographic map sketched by Mr. D. Corcoran, of Candelaria, and forwarded with his compliments, will give you a very correct view (looking southward) of the last named place, bearing in mind its rapid growth since the sketch was taken, as also of the ground and hoisting works of

The Northern Belle Mine.

Coming into existence in a dry and desolate land where all supplies were dear, where wood and water could scarcely be bought for gold, horn of toil, nurtured in hardship, this child of fortune has ever taken the lead in the district, and to-day stands as fairly queen among the fairer of her most favored sisterhood on the coast.

Only the most salient points in her career need be given. The mine has attained the depth of 1,700 ft. from the summit of the mountain; width of lode 100 ft.; of ore bodies from 2 to 30 ft. Gross bullion product, \$7,000,000; actual value in gold coin, \$6,000,000; disbursed in dividends, \$1,625,000; average yield per month, \$100,000; yield last month (Aug.), \$150,000. Two large 20-stamp mills with a Stedfeldt furnace attached to each have been erected at Belleville, from 7 to 8 miles from the mine; capacity of the mill 110 tons per day; men employed at mill and mine, 250; number of tons of salt used, 250, and 1,000 cords of wood. As bright as this picture seems, the mine has had her dark days. One year ago on the 1st of September, she was in debt to the amount of \$133,000.

Since that date the indebtedness has all been liquidated, and \$100,000 paid in dividends, leaving \$112,000 now in the treasury. Prospects of the mine are said to be good, giving promise of doing nearly as well as in her palmiest days, the gross product of the past year footing up the neat little sum of \$1,242,000.

So long as the quantity and quality of ore holds out under the present management, stockholders may rest securely and may look for many a dividend. The Silver Star, adjoining the Northern Belle on the west, is represented to contain ore similar in every respect, and from \$30 to \$100 per ton in value. Depth on the lode, 200 ft. Coming next on the north side of the belt is

The Enterprise.

Two lodes have been cut by a tunnel 640 ft. in length. The ore is here considered low grade, running from \$25 to \$40 per ton. The time will come at no very distant day when all now will be worked with a profit. The tunnel is now being pushed for the back or principal lode, which is expected to be reached with a run of 60 ft. more. It is said to contain some very fine ore, giving upwards of \$100 in assays. It has been opened by a shaft on the surface to a depth of 50 ft. The vein from 20 to 30 ft. wide. The Vanderbilt, adjoining on the west, is said to be a good deal broken up in present workings. The ground is thought to be favorable, but a much greater depth will probably be required before finding a permanent ore body. Next in order is

The Victor.

A promising mine of three locations, known as the Victor proper, the Magnet and the Chloride. Deepest work on dip of vein 550 ft. from croppings. Two lodes have been cut by a tunnel into the mountain from the north. The

ent be worked with profit. Full width of back lode not ascertained as no cross-cutting has been done. It is evidently large, as from five to six ft. of very fine ore is now being extracted along the hanging wall. Drift east and west aggregate 400 ft. The ore is worked at the Rhode mill, New Boston, yielding somewhere from \$50 to \$70 per ton. Considerable bullion has been already shipped. It is looked upon as one of the coming mines of the district, having a first-class location.

The Mount Potosi Series

Lie south of the Victor near the west end of the belt. They are very favorably situated on the western slope of Mount Potosi, and consist of several locations, among which are the Star of Nevada and Mount Potosi proper, into which a tunnel is now being driven. Some very fine ore has been cut in its course, and there is every reason to expect richer and larger ore bodies the further it pierces the heart of the mountain. The greatest depth yet reached in any of the workings is 300 ft. A number of veins cut from 1 to 6 ft. wide. Ore worth from \$30 to \$40 per ton—too low a figure to pay without a mill on the ground. Some ore of a much higher grade has been encountered, 324 tons recently worked at Belleville giving pulp assays as high as \$84 per ton. Near the Mt. Potosi and above the Victor is the Candelaria (No. 1), the property of W. J. Sutherland, Esq., of Columbus, shaft down 50 ft., and represented to have a 2-ft. vein of pay ore. It promises to be a rich field for operations, all the indications in this quarter being of the most favorable character.

The New Jersey Group.

Is in a good location on the eastern slope of Mt. Potosi, although work has been suspended, it is hoped, only temporarily. A mine that has milled 30 tons of ore, going to \$280 per ton, ought not to lie idle long.

The Lucky Hill

Is situated on the lucky side of the mineral zone, nearly opposite the Enterprise, a ravine dividing the locations. A tunnel cuts the vein at right angles about 100 ft. from its mouth and 45 ft. from the surface, where 58 ft. of solid ore is encountered, averaging \$25 per ton. The tunnel has been extended 300 ft. further, passing through low-grade ore mixed with porphyry the distance of 58 to the foot wall, making a total of 110 ft. between walls, these both well marked. After passing the south wall a hard elicitified slate comes in, gradually shading off into the softer clay slate toward the end of the tunnel.

A tunnel has been sunk 238 ft., following the hanging wall, and a drift from tunnel level 100 ft. east along the same wall. Average assays of ore from a point in the winze 130 ft. from surface \$57, showing a very marked improvement on the attainment of greater depth. Capacity of hoisting works sufficient for 800 ft. of depth.

The Equator.

Comprising the Yellow Chief, Richmond, Welch, O'Keefe and Burning Moscow, embrace one of the largest and most favorably situated properties in the district, lying immediately east and adjoining a portion of the Northern Belle ground, where good ore was taken out up to the dividing line. Two tunnels were started with the view of prospecting the ground, developing some good ore averaging \$169 per ton, but not being very favorably situated, the work was discontinued until late spring, when the company commenced sinking a joint shaft, a further account of which will appear after a brief notice of

The Metallic.

This mine is bounded on the west by the Equator and on the east by the Mount Diablo, the eastern line of claim extending to within a short distance of the famous Mountain Boy lode, discovered two years since, and being one of the Mount Diablo series of veins. An incline was sunk 350 ft. and two drifts run on the vein from the 300 level, developing some good ore, but the ground at the bottom of incline and also in the drifts being found somewhat broken, the exploration in this manner were discontinued for the purpose of joining the Equator in sinking a shaft which is known as

The Equator and Metallic Joint Shaft.

This is one of the important enterprises in the district. It is one of the best and most economical modes of mine development, and the example might be followed with advantage by other companies. It is about time the old method of running a tunnel 1,000 ft. to attain a depth of 100 ft. should be abandoned. First-class hoisting works have been erected with good shaft house, blacksmith and carpenter shops and everything put in good shape. The machinery has sufficient capacity to sink 1,500 ft. The shaft is 4x4 and has now attained the depth of 500 ft., well timbered all the way down. At the 400 ft. level a station has been cut with a view of starting a drift through the Equator ground in the direction of the Northern Belle, from which crosscuts will be made to prospect the mine. As soon the shaft reaches the depth of 600 ft. a drift will be run into the Metallic and crosscutting for the veins vigorously pushed.

Sutherland Claims.

Lying in the center of a triangle formed by the Mount Diablo and Metallic mines and the Northern Belle shaft, W. J. Sutherland, Esq., owns and is working, as we are informed, some very valuable claims, said to be pronounced by experts as among the best properties of the district. They are worked through a double compartment shaft, now down 230 ft., from which he will crosscut as soon as the machinery

The Malloy.

The property of Mr. P. Malloy, of Metallic City, is a promising prospect, cropping out in bold relief in the rear of his place in the middle of the town above named.

The Southern Nevada

Is in a good neighborhood, immediately east of the Northern Belle on the north side of the belt. The mine lies partly within or near a greenish dyke of harder rock than the ordinary formation, cutting some distance into the mineral zone at this point. It bears some of the marks of a green slate, but is more likely a variety of slate, somewhat altered by the same cause that metamorphosed the surrounding slate. It is rather a favorable sign than otherwise, for ore cropping out within or on either side of such a formation ought to be well concentrated. The future will determine the question.

The incline is 230 ft. on the vein. Some of the ore is represented as rich, assays running from \$25 to \$675 per ton, working value not learned.

The Holmes.

East of the Belle and south of the Nevada, is probably very similar to the last, as the formation and contour of the ground are much alike. No details were secured.

The Belding.

Next in order east, shows a 10-ft. vein at the depth of 76 ft., of a very promising character. It is hoped that the crosscut from foot of winze on the 210-ft. level will soon develop a rich body of ore.

This letter is perhaps long enough. You may look next week for some account of the

Mount Diablo.

A very prominent mine on the west end of the belt, as also of others of more or less importance lying farther east. A review of what has been given shows that there is much rich ore here—many very fine prospects as yet but little developed, and an immense body of low-grade ore that will eventually pay to work.

A. C. K.

News in Brief.

A CHINAMAN has entered the Harvard freshman class.

THERE is no abatement of the horse disease in New York city.

WASHINGTON, TER. gave a cordial welcome to the Presidential party.

In the great telegraph unit, the Western Union gained its point.

BUSINESS is reviving at Seattle, W. T., and other points on the Sound.

THE Irish Land League has extended its organization to Great Britain.

THERE is no prospect of military operations before Dulcigno for ten days.

JACQUES OFFENBACH the famous musician and composer died on the 5th inst.

YELLOW fever caused the death of 78 persons in Havana during September.

THE total coinage at the United States Mints during September was \$6,340,565.

By a stage accident at Yosemite, Rev. Father Traynor, of New York, was killed.

FLOODS in Bengal have caused the loss of many lives and great injury to the crops.

THE sale of Bernhard tickets at New York Saturday netted \$21,000 in 45 minutes.

PLEURO-PNEUMONIA continues to spread among the swine in Lancashire, England.

THE Government of Chihuahua offers a reward of \$2,500 for the scalp of Victorio.

It is believed that the Russian government intends to reopen negotiations with China.

GENERAL BUELL's campaign against Victorio's Apaches has proved an utter failure.

SINCE July 1st the foreign gold brought to this country amounted to about \$35,000,000.

THERE is great anxiety in Italian official circles in regard to Garibaldi's movements.

AUGUST F. WEBER, an old resident of Stockton, was accidentally drowned in the canal.

ARRANGEMENTS are completed for building a bridge across the Willamette river at Portland.

DURING September the public debt was decreased \$8,974,891; since June 30, 1880, \$26,573,112.

A PARTY of freighters are supposed to have been murdered by the Ute Indians near Cline's ranch, Col.

THE 2,000 hostile Sioux at Fort Keogh, Wy. T., are to be fed during the coming winter by the Government.

THE American schooner, J. H. Roscoe, from San Francisco, was wrecked at La Libertad, Salvador, September 19th.

SPAIN is willing, on certain conditions, to abandon her claims on the port of Agadir, Morocco, in favor of Germany.

THE Alhion print works at Conshohocken, Pa., with a capacity of 2,400,000 yards per month, have suspended operations.

THE epizootic has appeared in St. John's, N. B. In New York and the vicinity nearly 10,000 horses are sick of the distemper.

THE transfer of \$10,000,000 in gold from the New York Assay Office to Washington has been ordered by the Treasury Department.

THE steamship Isaac Bell, when nearly ready to sail from Norfolk for New York Saturday, took fire and burned to the water's edge.

THE Atchison, Topeka and Santa Fe Railroad Company expect to connect with the Southern Pacific railroad by January 1st.

THE Nevada State fair, which closed at Reno Saturday, was poorly patronized, the

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the **MINING AND SCIENTIFIC PRESS** which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

J. O. COLMERNIL is requested to report to this office. He went to Humboldt County, Cal., about May 4th, 1880. His Agency for this paper has been revoked for good and sufficient reasons. Mr. C. is a heavy set man, of dark complexion, weighing some 175 pounds, or more.

Chew JACKSON'S BEST Sweet Navy Tobacco.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

San Francisco, October 5, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 10) of Twenty (25) Five cents per share was declared, payable on Friday, October Fifteenth (15), 1880, at the office of the Company, room No. 4, 315 California Street, San Francisco, California. Transfer books will be closed from Tuesday, October (12) Twelfth, 1880, until Saturday, October (16) Sixteenth, 1880. JOSEPH NASH, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,

SAN FRANCISCO, OCTOBER 2, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. (30) Twenty-five (75) Five Cents per share was declared, payable on Tuesday, October (12) Twelfth, 1880, at the office in this city, or at the Agency of The Nevada Bank of San Francisco in New York. WM. WILLIS, Secretary. Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

ANNUAL MEETING.

The regular annual meeting of the stockholders of the Spaulding Gold and Silver Mining Company will be held at the office of the Company, No. 117 Battery street, San Francisco, California, on TUESDAY, the Twelfth (12) day of October, 1880, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may properly come before the meeting. Transfer books will close on Friday, the Eighth (8) day of October, at 12 o'clock M., until after the meeting. JOHN HEIN, Secretary. Office—No. 117 Battery street, San Francisco, Cal.

Techattup Silver and Gold Mining Co.—Location of principal place of business, San Francisco, Cal. Location of works, El Dorado Canyon, Lincoln

NOTICE—There is delinquent upon the following described stock, on account of assessment (No. 7), levied on the 24th day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Avory, Benj P.	161	100	\$ 100 00
Barrows, Henry D.	230	50	50 00
Cutler, Sam'l M.	200	100	100 00
Corbett, Miles S.	190	36	36 00
Cole, Lewis N.	135	100	100 00
Cole, Lewis N.	136	50	50 00
Cole, Lewis N.	137	50	50 00
Cole, Lewis N.	138	50	50 00
Cole, Lewis N.	139	50	50 00
Cole, Lewis N.	140	50	50 00
Cole, Lewis N.	141	50	50 00
Cole, Lewis N.	142	50	50 00
Cole, Lewis N.	143	50	50 00
Cole, Lewis N.	144	50	50 00
Cole, Lewis N.	145	50	50 00
Cole, Lewis N.	146	25	25 00
Childes, O. W.	127	100	100 00
Caley, Wm.	32	200	200 00
Caley, Wm.	221	100	100 00
Childes, M. W.	17	100	100 00
Dockweller, Henry	97	30	30 00
Dockweller, M.	15	100	100 00
Foster, David	203	54	54 00
Foster, David	237	200	200 00
Dockweller, Henry	231	120	120 00
Giffith, Sarah A.	247	30	30 00
Hobbs, H. H.	240	1000	1000 00
Hobbs, H. H.	241	1000	1000 00
Hobbs, H. H.	242	500	500 00
Hobbs, H. H.	243	500	500 00
Hayes, R. T.	236	500	500 00
Huber, Wm H.	213	50	50 00
Hoyt, Mrs Irene	169	100	100 00
Hoyt, Albert	165	50	50 00
Hoyt, Albert	183	100	100 00
Hoyt, Mary E.	123	70	70 00
Hoyt, Mary E.	128	50	50 00
Hoyt, Mary E.	159	50	50 00
Hoyt, Mary E.	225	925	925 00
Hoyt, Mary E.	228	500	500 00
Hall, John H.	208	72	72 00
McGuire, Robert K.	207	54	54 00
McKeeby, L. C.	248	300	300 00
Nelson, James	98	200	200 00
Pray, Amos	250	500	500 00
Rubottom, Wm W.	153	50	50 00
Thomas, Chas W.	01	100	100 00
Tryon, E. B.	251	200	200 00
Urmiston, David	204	18	18 00
Vineyard, J. R.	23	250	250 00
Vineyard, J. R.	24	250	250 00
Vineyard, J. R.	25	250	250 00
Vineyard, J. R.	26	250	250 00
Whitcomb, A. C.	62	100	100 00
Whitcomb, A. C.	63	137 1/2	137 50
Whitcomb, A. C.	173	2 1/2	2 50
Workman, Nancy	18	275	275 00

And in accordance with law, and order of the Board of Trustees, made on the 24th day of August, 1880, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, No. 237 First St., San Francisco, Cal., on Wednesday, the 20th day of October, 1880, at the hour of one o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

C. F. MOULTROP, Secretary.
Office—No. 237 First St., San Francisco, Cal.

Gover Mining and Milling Company.—Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE—There is delinquent upon the following described stock, on account of assessment (No. 43), levied on the Eleventh day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Ellis, H. C.	296	250	\$ 50 00
Hulme, Eliza J.	245	500	100 00
James, James	05	63	12 80
James, Frederick	381	62	12 40
McAfee, Wm.	200	500	100 00
McAfee, Wm.	201	500	100 00
McAfee, Wm.	202	190	38 00
Miller, W. J., Trustee	243	1750	350 00
Miller, Eliza J.	391	500	100 00
Morgan, W. S., Trustee	386	1000	200 00
Morgan, W. S., Trustee	387	1000	200 00
Morgan, W. S., Trustee	388	2000	400 00
Oates, Wm.	67	100	20 00
Oates, John	68	125	25 00
Ream, Charles	72	50	10 00
Ream, Charles	73	50	10 00
Ream, Charles	74	50	10 00
Saunborn, F. G.	385	250	50 00
Skinner, Maria	384	250	50 00

And in accordance with law, and an order of the Board of Directors, made on the Eleventh day of August, 1880, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, No. 402 Front street, room 8, San Francisco, Cal., on Monday, the Eleventh day of October, 1880, at the hour of one o'clock P. M. of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of sale.

W. O. WILSON, Secretary.
Office—402 Front street, Room 8, San Francisco, Cal.

Lewis Consolidated Silver Mining Company.—Location of principal place of business, San Francisco. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2d) day of October, 1880, an assessment, No. Three (3), of Ten (10) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 15, No. 310 Pine Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the First (1st) day of December, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the (20th) Twentieth day of December, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Secretary.
Office—No. 310 Pine Street, Room 15, San Francisco, Cal.

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For Consumption, Asthma, Bronchitis, Dyspepsia, Catarrh, Headache, Debility, Rheumatism, Neuralgia and all Chronic and Nervous Dis. orders. It is taken

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Marine, Stationary and Portable Boilers, Smoke Stacks
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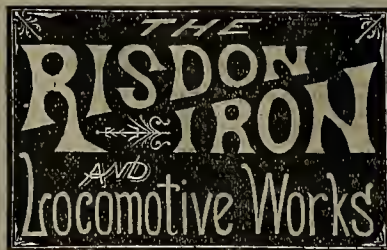
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satisfaction. This is the only
establishment on the coast de-
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HOWLAND'S PULVERIZER Takes the Place of the Cumber-
some Stamp Mill and can be put up in one day ready for work.

IT HAS BEEN FULLY PROVED AND TESTED.

It weighs complete, 7,000 pounds. It costs \$1,250 ready for the belt. Will crush one ton per hour of hard quartz that will pass through a 40-mesh screen. The wear is less than in the stamp mill. The wearing parts are plain castings and can be dropped into position in a few moments, as shown by the letters A, B and C, no bolts or keys are required; it can be set upon the floor of a mill with no expense for foundations, and can be used to crush and work in charges or continuous. It will amalgamate either gold or silver ores, making a simple, cheap and effective mill, it requires twelve-horse power.

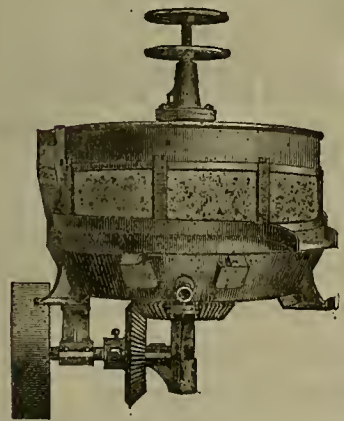
Stamp Mills, Rock Breakers, Crushing Rolls, Amalgamating Pans and Separators for Gold and Silver Ores, Chloridizing Furnaces, Retorts, Rock Drills, Air Compressors, Steel Shoes and Dies for Stamps, and every description of Mine and Mill Supplies, Iron Work complete for Wood Frames, also

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Great saving in time and money over the Wood Frame. It is made complete with Wrought Iron Frame ready to put upon the foundation. We construct Mills with Stamps weighing from 350 to 900 pounds for Gold and Silver Ores, Wet or Dry Crushing Mortars.

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This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all; and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. The simple arrangement, durable as it is simple, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in mining and milling can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

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LEA AND PERRINS' SAUCE,
which are calculated to deceive the Public, Lea and Perrins
have adopted A NEW LABEL, bearing their Signature
thus,

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which is placed on every bottle of WORCESTERSHIRE
SAUCE, and without which none is genuine.
Ask for LEA & PERRINS' Sauce, and see Name on Wrapper, Label, Bottle and Stopper.
Wholesale and for Export by the Proprietors, Worcester; Crosse and Blackwell, London,
&c., &c.; and by Grocers and Oilmen throughout the World.

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STEEL CASTINGS

FROM 1-4 TO 10,000 lbs. WEIGHT.

True to pattern, sound and solid, of unequalled strength, toughness and durability.
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Gearing of all kinds, Shafts, Dies, Hammerheads, Crossheads for Locomotives, etc.
15,000 Crank Shafts and 10,000 Gear Wheels of this Steel now running prove its superiority over all other Steel Castings.
CRANK SHAFTS, CROSSHEADS and GEARING, specialties.
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Models for the Patent Office, in Wood or Metal. Separate rooms for inventors to perfect their inventions. Chemical Apparatus. Pressing and Stamping of all kinds of Metals.
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HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade

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Also on hand and for sale A FULL LINE OF MILL AND MINING SUPPLIES.

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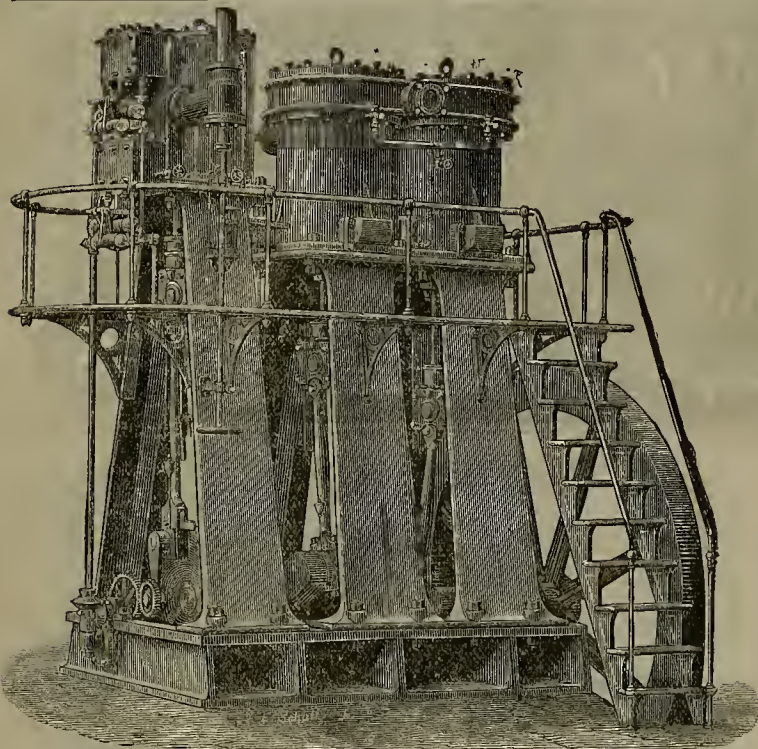
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SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

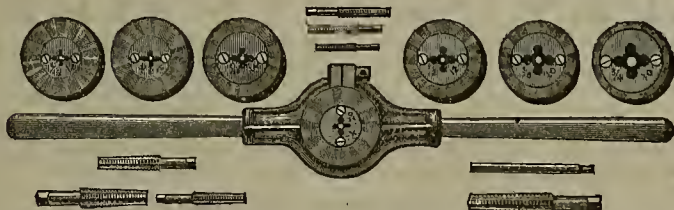
Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

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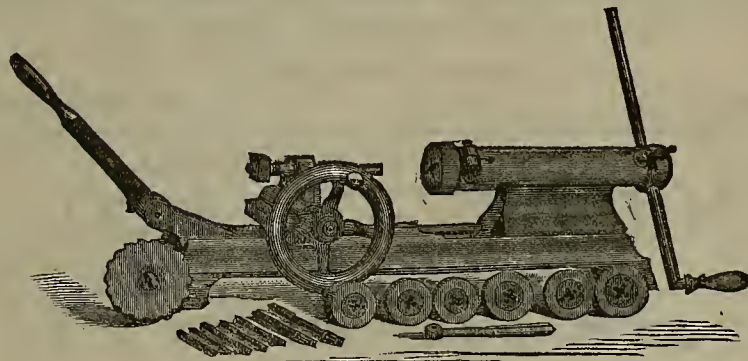
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WITH TAPS, DIES AND COLLETS COMPLETE.

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C, " 26 " " 7 " " " " $\frac{3}{8}$ to 1 "
D, " 53 " " 6 " " " " $\frac{1}{2}$ to 1 $\frac{1}{2}$ "

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ESPECIALLY FOR CROOKED WORK!

Made to be bolted to the Bench or Table. Fitted with seven sizes, from $\frac{1}{4}$ to $\frac{3}{4}$ inch. Usual assortment, $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ inch.

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AMALGAMATING PLATES.

1 oz. of Silver Deposit to 1 square foot for \$3.

All orders promptly attended to.

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Stronger, Better and Safer than any other High Explosive.

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IS NOW USED IN ALL LARGE HYDRAULIC CLAIMS.

It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. Triplo Force Caps and all Grades of Fuso.

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VULCAN BLASTING POWDER.

The Strongest, Safest, Most Uniform and Reliable "HIGH EXPLOSIVE" Manufactured on the Coast.

MINERS TESTIFY THAT IT IS FREE FROM OBJECTIONABLE FUMES.

We call the attention of all desiring such a Powder to our various grades, which we are prepared to sell at LOWEST RATES.

No. 1.—Equalling Liquid Nitro-Glycerine in Strength. We recommend this Grade in extremely hard rock, boulders, iron, etc.

No. 2.—Will do the work thoroughly in all but the hardest kinds of rock.

No. 3.—For bench work, pipe-clay, soft and shelly rock, outside work and quarrying.

Single and Triple Force Caps, Fuse of all Grades, Vulcan Powder Thawing Boxes, Batteries and Exploders, For Sale at the Lowest Rates.

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The Huntington Oscillating Stamp.

We illustrate on this page the Huntington oscillating stamp mill. This is an entirely new invention, and one which is out of the usual track, being really a stamp without stems, cams or tappets. It consists essentially of a bifurcated arm, at the upper end of which is the pitman for oscillating it back and forth. At the lower ends are the shoes, which rest on dies having inclosed sides or back pieces. As the arm is oscillated, first one shoe strikes and then the other alternately. By the peculiar construction a grinding as well as a crushing action is maintained. The shoe strikes and crushes the rock and then slides along a little, grinding the crushed rock under it. This combines therefore the action of the stamp and arastra. The engraving shows the operation so plainly that a detailed description is unnecessary. This machine is very simple and economical, being durable and working effectively. From its peculiar construction the power required is comparatively light. Among mining men this machine is attracting a great deal of attention. It is a cheap mill, an \$50 lb. hammer costing \$500, while one with 1,200 lb. hammer costs \$600. For double mills, working from same shaft, \$50 is deducted from price of second stamp at above figures.

The alternate rocking of the bifurcated weight brings first one leg in contact with the ore and then the other, the ore being thus rapidly crushed, and the whole weight of the stamp never having to be lifted. When, however, the weight begins to fall all the weight of both legs is imparted to the blow that the falling one delivers. The lower shod ends of the legs always keep in the proper position, since the rounded corners of the mortar give them a tendency to move towards the center at each blow. This peculiar motion is attended with a grinding or pulverizing action as the stamp is shifted in another direction.

The machine is so arranged that an automatic ore feeder may be used with it. Very little power, comparatively, is required to operate the bifurcated stamp or weight, while its action is very effective. One stamp acts as a fulcrum to raise the other, the action being alternate.

There are four of these mills at work at the California Water and Mining Co.'s mines, El Dorado county; two at Oro Fino mine, Shingle Spring; two at Hornitos, Mariposa county. There is also one at Forbestown, Butte county; one in the Black Hills, one in Idaho, one in Washington Territory, three on the way to Arizona, etc. A number are now being made at the foundry, 213 Fremont St., where Mr. F. A. Huntington, inventor and manufacturer, has his headquarters, where further information can be had.

GREENVILLE QUARTZ MILLS.—In order that the outside world may have some idea of the importance of the Greenville mining district, the Greenville (Lincoln Co.) *Bulletin* gives the number of stamps in the various mills in that immediate vicinity. Those now running or that will be in a few days, with the names of the mills, are as follows: Green Mountain, 92; Gold Strike, 39; Plumas National, 30; Kettle (Cherokee), 20; New York, 10. Total, 191. Stamps that will probably soon be running, are the following: Union and Indian Valley, 56; Crescent, 32; Monitor, 10; total 98. Making a grand total of 289 stamps. What other mining district in the State surpasses it?

PLACER COUNTY MINES.—The mining industry in the vicinity of Dutch Flat shows a great deal of activity. The *Forum* says: It is a noticeable fact that at the close of a successful mining season a greater number of claims are taken and patented than at any other time, hence the unusually large number this fall. All persons who have old claims or who have taken up new ones are of the same opinion, that the next season's run will be even more prosperous than the one just closed. Extensive preparations are being made on all sides for an expected long and paying season in the future.

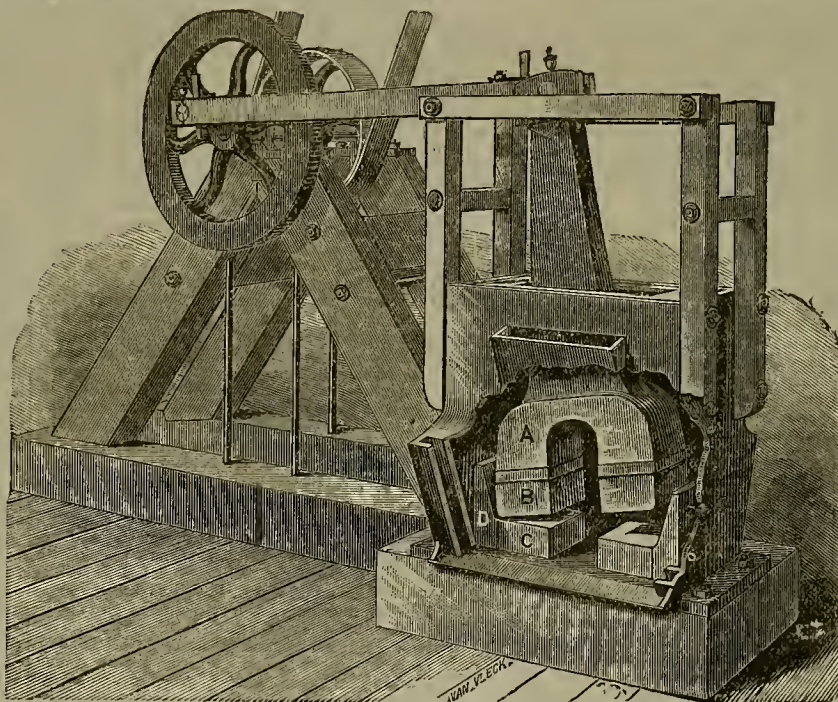
Mazourka Canyon Smelting Ores.

Mazourka canyon, opposite Independence, in the Inyo range, says the *Independent*, offers a better field to-day for smelting operations than any other district in the State of California. The canyon begins nearly opposite Independence, and runs nearly due north for a distance of about 12 miles. A good wagon road with an easy up grade runs its entire length. The head of the canyon is called Badger flat, which is not exactly a flat, but low, rolling hills, thickly covered with nut-pine wood interspersed with a few cedars. This is the source of the wood supply for Independence, and the quantity seems almost inexhaustible. The canyon cuts the Inyo range obliquely, and the general formation on the west side is mostly granite and syenite, and in this granitic rock has been found numerous veins of gold-bearing quartz, and some of them exceedingly rich, though none of them have been ex-

plained more than 100 ft. in depth, owing to the lack of the necessary capital to develop. On the east side, which is the main mountain range, the formation is entirely different, being mainly lime and slate, and it is in this formation that the smelting ore is found. Here a large number of locations have been made, and some of them have been prospected to a considerable extent, with very encouraging results. The character of the ore is carbonates and sulphurets of lead or galena, assaying from 40% to 50% of lead, and nearly all of these ores carry both gold and silver, the yield in silver is from 50 to 75 ozs. per ton, and about \$10 in gold, making the value of the ores from \$75 to \$100 per ton. From the developments made, there are evidently extensive deposits of these ores to be had, and they lie in just the right kind of formation for large bodies to be found. Among the claims that have been developed, are the Eagle, the Giant, the Cumberland, the Josephine and the No Name. These claims have from 20 to 30 tons of good ore on their dumps, and plenty of ore in sight, awaiting a smelting furnace to show up its metallic riches. The facilities for smelting in Mazourka canyon are first-class; plenty of water can be had within one or two miles of the mines; charcoal can be delivered at a furnace by the quantity for 20 cents per bushel; wood can be had at from \$5 to \$6 per cord; there is plenty of skilled labor in the country, and the produce raised in the

valley is comparatively cheap; in fact, there is every inducement for some individual, or company to erect smelting works. A smelter erected on a liberal basis, and prepared to buy ores from the miners at a fair price, would induce a large number of men to go to work taking out ore and opening their mines, and the smelter would be reaping large profits in buying the ores and turning them into bullion. In the Inyo range, mild weather prevails through nearly all the winter months; the snow falls only a few inches in depth at a time, which soon disappears, and there is no obstacle to the prosecution of active work during every month in the year. That Mazourka canyon is not half prospected is proved by the recent rich discoveries there, and we confidently expect at no distant day to see the smoke from the stacks of the smelting furnaces gracefully curling above the foothills across the river.

CURIOSITIES.—The miners in the Monte Cristo mine at Spanish Peak, find numerous petrifications, the trees standing in every shape in



THE HUNTINGTON OSCILLATING QUARTZ MILL.

the clay. One of the most singular ones is a tree cut off by a drift from the main tunnel, which is, or was, about 30 inches in diameter. It stands perpendicular in the clay-pipe, and has a hollow place where the heart of the tree was located, some 3 or 4 inches in diameter, in which the light of the candle reveals the grain of the wood. It is a hard, sandy formation, slightly red in color, and to tally unlike any specimen of petrified timber we have ever seen. The round shape, the hollow heart and the bark are, however, conclusive evidence that at one time it was a tree; and besides it is entirely different from the clay which surrounds it. Another curious place in the mine is a crack or crevice in the bedrock in the deepest worked place in the mine. This crack is not more than 4 inches in length, and 1/2 inch in width, but a steady stream of air rushes out of it, which will blow out a candle instantly. The question is, what does it connect with?—*Plumas National*.

BUT little work is now being done in the once famous camps of Florence, Elk Creek, Jordan Creek or South Boise, Idaho. The placers on Snake river and on various tributaries of the Salmon, however, have paid very good wages to all the men employed for the past two or three years, with plenty of good ground still to be worked.

Smoking in Mines.

It seems strange that it should be so difficult to prevent men smoking in mines, more especially in coal mines, where there is danger of explosion. Even the most seasoned smoker cannot go into a close drift where a pipe has been smoked without nausea. The stale smoke will sicken almost anyone. There are usually stringent rules against smoking, but men break them and even risk their own and other people's lives for the brief enjoyment of a pipe.

It is a matter in which the government intervenes in Europe, and it is not left to individual companies to adopt and enforce a rule. Smoking in mines is in direct contravention to the Mines Regulation Act. How they serve those who break the rules is shown in the following incident.

Roht. McFarlane, laborer, pleaded guilty before Sheriff Byrne, to having on the previous morning smoked in the Cadzow colliery, Hamilton, near a place where explosive gas is known to exist, and is issuing from the coal in great volume, and safety lamps are used, and thus endangering the lives of 30 persons then employed in the mine. He stated that he was employed filling water, a cold, wet job, which caused him to be, for the most of his time, sitting waiting till the water gathered, and he went to a manhole, where the lamps were lighted, and lighted his pipe after scratching two matches. The procurator-fiscal could not admit the accuracy of this. He explained that there was no lamp cabin below ground; that this place was a stone mine, across a dike; therefore into a new field, where, if the mine is fiery at all, gas was given off in great quantities. There were 30 men employed, all, for greater safety, with Stephenson's safety lamps. The ventilation of the pit was so complete that the gas was carried off as it was made, but any impediment to the free passage of air would make the gas explosive in the course of a few minutes. The rules regarding lights and smoking were enforced most rigorously; indeed, no man was known to go within the gate of the colliery with a pipe in his possession. The sheriff asked if there was any mitigating circumstance in the case. The fiscal answered in the negative. He thought it was about the worst case that had occurred in all his experience. The sheriff said he was impressed firmly with the idea that there was only, in this district, among those fiery mines, one mode of dealing with these cases. If he could find any mitigating circumstance, he would not send a working man to jail for so long a period; but when he considered the lives which the man recklessly put in jeopardy—his own fellow-workmen—and that were he to make the punishment less than he had previously done he might be leading to most disastrous results; he firmly believed it was his duty to insist upon the same punishment he had previously inflicted, viz., three months' imprisonment.

CONSIDERABLE prospecting is now being done in the hills, near Bishop Creek, Inyo Co., so at no distant day new mining towns are liable to spring up like "mushrooms in June," making the lucky ones rich and prosperous.

IN Atlanta district, Idaho, the ore is silver bearing. Several Eastern and one Indiana company own valuable mines in this district, which they have constantly worked for the past 14 years.

MANY persons unacquainted with the topography of Idaho imagine it to be a barren, cold and inhospitable region generally, something like Alaska. Such an idea is extremely erroneous.

THE name of the miner who was burned alive in his cabin at Grass Valley on the 6th inst., was Charles Mulheren, and not O'Brien, as at first supposed.

SINCE the first discovery of gold in Idaho, on Oro Fino creek in 1860, the total yield of the Territory has aggregated the enormous sum of \$90,000,000.



CORRESPONDENCE.

We admit, unreservedly, opinions of correspondents.—Ed.

Columbus Mining District, Nevada.—No. 2.

[From our Traveling Correspondent.]

COLUMBUS PRESS:—Nature seems always to follow some general plan. In this sense, her laws are invariable. There is, however, usually a certain pleasing variety in her operations, caused often by very slight differences in surrounding conditions. The Constock, if rightly apprehended—is one vast mineral zone, the ore being found in veins or chimneys in the midst of the interlying porphyry, and holding a course somewhat parallel at the different depths attained. Such is the case with the ore veins of Candelaria, with this difference, however, that here they are, perhaps, better marked and the ore bodies more readily traced. But at this point the parallel masses. The Constock is a well determined contact vein or lode. What may be the nature or the proper designation of the lode or vein of this section, is a question that probably yet remains to be decided. In the light of present developments, there is little reason to pronounce them true fissures in any ordinary use of the term. They are in most cases too well defined to be styled banded veins, such as are frequently found in the Himalayas. And there is as yet no very clear evidence of a contact between different formations. There is a rock, it is true, unlike the slate formation at one point on the north, that puts part way into the same. It looks more like a false slate than any other, and might be taken for a variety of slates, or for one of the forms of hornblende. It is barely possible that this magnesian rock may hereafter be found to extend, and even, some think, the northern boundary of the belt; and thus along it a contact lode, its general similarity to the Constock suggesting such an inference. One thing is certain. Nothing anomalous has ever yet been written in the great book of nature. If we fail to understand, it must be set down to lack of sufficient data or capacity to read and interpret aright. But what matters it whether it is a contact, bedded vein, true fissure or what not, as long as gold ore holds out as now on the lowest levels reached, or while a million of bullion or more is annually shipped, and

Northern Belle

continues to gladden as many hearts and houses with her regular monthly dividends. Nor is this all. Other mines promise soon to be put on a paying basis.

The Mount Diablo

In particular may be mentioned as a star of the first magnitude, just now beginning to appear above the horizon. The mine is very favorably located south of the dyke previously alluded to, immediately above Metallic City, and a mile from Candelaria. It ranks next to Northern Belle in bullion production. A very considerable amount was extracted years ago, one excavation, near the surface, yielding as much as \$488,000. The present depth of double compartment shaft is 350 ft. Levels are opened at the 150, 250 and 350 ft. stations. Now drifting and stopping on the first and second levels—the first producing about 45 tons per day. A very thin body of ore is understood to have been struck not long since on the second level. The third level has been run 150 ft., and has yet to make about 40 ft. more before cutting the lode. The value made of ore and ledge matter together is fully \$50 ft.

The best pay ore on the 150 ft. level is from 2 to 10 ft. wide, averaging \$100 per ton. The best, if assayed, would yield as much as \$700. On this level there are hundreds, if not thousands of tons, of lower grade ore that can be made to pay a profit with cheaper mining and milling facilities. The company is now shipping at the rate of 60 tons per day to one of the Northern Belle mines, the result of which will probably soon be heard from.

Anticipations as to the future of the mine are at present running high. Many supposed to be well posted, are of the opinion that she is destined at no very distant day to rival, if not eclipse, her dividend-paying neighbor to which allusion has more than once been made. So much for her.

The East Mount Diablo

Adjoining the above, has had little development on the surface. Lying between the Mount Diablo on one hand and the East, Jackson on the other the character of the ground will soon be determined by the explorations now going on in these mines. The Mount Diablo on one of her levels is now within 150 ft. of the lode, and said to have at this point a good strong vein.

The East Jackson's Share

Is also within 150 ft. of the east end of the East Mount Diablo's ground, and as both properties belong to the same company, prospecting will be carried on simultaneously.

The Jackson's incline shaft is now down 150 ft., following the vein.

About 85 tons of ore looked upon as first-class have been taken out, estimated to mill \$100 per ton, and the mine is considered a fine prospect.

The Candelaria (No. 2).

South of the Gen. Jackson and East Mount Diablo, has recently struck very fair ore. Shaft, 80 ft. deep and drift on lode, 150 ft.

The Mountain Girl

The property of Messrs. Sutherland, Murphy, and McLean, is situated due east of the Mount Diablo hoisting works. It is the first extension of the Denver or the famous Mountain Boy lode. Shaft now down 230 ft., and work rapidly pushed with two shifts.

The owners are very sanguine as to results.

The Windsor

North of the Jackson, some years ago extended ore that milled as high as \$300 per ton. Very good ore is said to have been found at the depth of 160 ft., the shaft on the way down, cutting veins from 8 to 10 inches wide, the ore giving assays from \$20 up to \$300 per ton.

The Bertha

Near the Windsor, is at present taking out ore worth \$300 per ton, assay value. Preparations are making to erect machinery.

The Eastern Belle

Running parallel with the Windsor, has a shaft 100 ft., a north drift 150 ft., and one south 170 ft., both through vein matter, but neither cutting the lode. An incline on the vein struck ore at the depth of 50 ft., that assays from \$20 to \$40.

The New England

Some distance further east, comprises several claims, being 1,500 ft. long by 1,400 ft. wide. It has been opened by shaft 120 ft., by incline, tunnel, winze and drifts, developing ore bodies in different parts of the claim. The ore, as to character, is classed as chlorite and magnesian. About \$60,000 worth was extracted at one point, working from \$250 to \$300 per ton. The mine is now being worked through a shaft and incline aggregating a depth of 130 ft., from which level an east drift has cut a body of ore, the extent and value of which are not yet known, two assays going respectively \$113 and \$212 per ton.

On the Columbus side of the mountain, W. J. Sutherland, Esq., has recently had some claims incorporated under the name of

The Highland Ohio

The ore is represented to be rich and the prospects unusually flattering.

The Tilden

One mile from the town of Columbus, was discovered as early as 1868, and yielded soon after a very considerable amount of bullion. It lies in the granite, and the rock is understood to be more than ordinarily rich. It has been relocated, and the work is expected to be vigorously prosecuted. On account of the water to be handled, hoisting works will be required.

Having now given a brief sketch of most of the principal mines of this great mineralized zone, it may be well to give some account of

The Two Great Drawbacks

To successful operations in the district, more particularly at the west end. Wood and water are both scarce and dear. Water sells at from 5 to 10 cents per gallon—is hauled from Belleville and Columbus, the distance of from 8 to 10 miles. When it is remembered that there are thousands upon thousands of tons of low-grade ore here, which could be made to pay with mills on the ground and cheap power for hoisting purposes, the magnitude of these drawbacks must be at once apparent.

Proposed Remedy.

It is understood that a franchise has been granted to a company to supply Candelaria with water. The source of supply is from springs about 10 miles distant. The company claims to be able to furnish 15 times the amount now used—a sufficiency not only for family use, but for all milling and mining purposes. The water has been tapped by a tunnel 1,000 ft. in length. The estimated cost is put somewhere from \$40,000 to \$50,000. It is understood, also, that an abundant supply of water can be obtained from another source, if needed. It will cost something more, the distance being greater. Scarcity of wood will be remedied as soon as the narrow-gauge railroad reaches Candelaria, and much of the ore can be shipped to Carson river or other points to be worked, if a sufficient number of mills are not in the meantime constructed for the purpose on the ground.

A. C. K.

MOUNT GREEN. All that region of mountainous country, on and about Mt. Grant, Esmeralda county, Nev., bears the same name as the mountain peak, and still there is a vast difference in the mineral character of the country within the space of a very few miles. For instance, on and about Mt. Grant proper, as well as about Squaw creek, a short distance from it, all the gold and silver-bearing area are more or less mixed with baser metals, while between the two lies a belt of free gold ore. On this middle belt, six miles south of the foot of Walker lake, and seven miles south of the proposed town of Milbrae, which is to be the shipping point for Bodie from the Carson and Colorado railroads, is located the Golden Eagle mine, owned, in part, by Bodieites, and near this is the somewhat famous Big Indian mine, both containing large quantities of free gold ore of high grade. The Big Indian people have sent to the Constock to purchase a mill, having an abundance of ore in sight. The Golden Eagle has also a large quantity of high-grade ore in sight, and several other claims on the "free belt" have fine prospects. *Radio Standard.*

Northern Esmeralda.

Revival of Operations in Old Camps.

A representative of the *Bodie Free Press* spent last week in the northern portion of Esmeralda county, Nevada, about 50 miles north of Bodie, and about 60 miles south of Virginia City, visiting Cambridge, Rockland, Pine Grove and other points.

The most extensive mining operations now in progress in northern Esmeralda are at Cambridge, at which point is situated two or three series of ledges and a 10-stamp mill. Most of the mines and the mill are the property of ex-Gov. H. G. Blandel, and are under the immediate personal supervision of Col. S. W. Blandel. The mines are located in a low range of granite hills, running northerly and southerly, which rise up from the plain between the range of mountains in which is situated Pine Grove and Rockland to the west, and the range of which Mount Grant is the principal peak to the east. The Cambridge mines have been worked to some extent for 15 or 20 years past, their discovery dating prior to that of the Constock lode. Numerous shafts have been sunk to a depth of from 100 to 150 ft., and the Wheeler Bros., who owned largely in the district years ago, when it was known as the Salt River district, erected a small mill on the banks of the East Walker river and worked the ores with more or less success. The ores are, except those taken from the Blackhorse mine, low grade and somewhat difficult to treat successfully. They contain copper, galena and iron in earbo-nate and other forms. In the precious metals gold largely predominates over silver.

A little over a year ago Gov. Blandel purchased the mines, which comprised the Williams, Blandel, Walker River, Black Horse and El Dorado, together with a ranch of bottom land on Walker river, about a mile distant from the mines. He replaced the old Wheeler affair with a 10-stamp mill of the modern sort, fully appointed with all the latest appliances, and a model of convenience and economy in working. It is run by water power, supplied by a large race from the Walker river, about three-quarters of a mile in length, from which, also, water is supplied to irrigate the ranch. In connection with the mill are two large boilers, used merely to supply steam for the pans, an office, assay office, retort room and manager's residence.

The mines are on three parallel ledges, about 1,000 or 1,500 ft. apart, and are each 600x1,500 ft. Each of the ledges shows separate and distinct characteristics, the Williams ledge showing the greatest tendency to baseness, and the Black Horse being the nearest free milling. The latter vein contains very rich ore, which is found in successive kidney-shaped chimneys. Its color is usually a reddish brown, and free gold can be seen on nearly every piece. The ledges are traceable on the surface for a mile, or even a greater distance. The granite formation is of a highly silicious character, and is filled with mica. The mines are easily worked, and there being a steady grade thence to the mill, ore is transported for reduction at a very light expense. The mill was completed last year, but, with the exception of a few experimental runs, has not been put to work regularly until this season. Some difficulty has been experienced in securing the services of an amalgamator competent to work the ores, containing as they do bases of various kinds. Dr. Matthews, who has a very extensive fund of scientific knowledge, is now attending to this work, and is meeting with considerable success.

The Virginia and Bodie line of stages runs up to the Cambridge postoffice, which is also Wells, Fargo & Co.'s office, which is in charge of Capt. J. H. Williams, as postmaster and express agent. Capt. Williams owns a mine known as the Reese; Capt. Williams and E. R. Willis the Willis mine, and E. R. Willis the Samant. The situation of the mill and ranch is very pleasant to the eye. Shut in on every side with low granite hills, the mountains further away forming a dark background, the willow-banked river running through the green meadows impart to the place the character of an oasis in the desert. It is 2,000 or 3,000 ft. lower than Bodie, and the climate is correspondingly mild, snow in the winter time seldom remaining on the ground more than an hour or two. Altogether Cambridge, while being a peculiarly pleasant place of residence, gives promise of becoming a profitable bullion-producing region.

Rockland

About eight miles to the west of Cambridge, in the same range of mountains in which is situated Pine Grove, is Rockland, a camp which years ago was a lively one, as its little graveyard, in which 8 or 10 were buried with their boots on, fully attests. The principal mine in this district is the Dolores, from which has been produced about \$200,000. This mine was purchased by Gov. Blandel four or five years ago, and a 10-stamp mill was erected by him. The fact that no snow fell for two or three years, caused such a drought that sufficient water could not be obtained to run the mill. As a consequence, operations have been almost suspended in the district since that time, with the exception, perhaps, of a little prospecting. Work has been resumed on the Dolores mine this summer, and Col. Blandel has taken out some ore and shipped it to the Cambridge mill for reduction. The mine has been developed by six different tunnels in the mountain about 100 ft. apart, all of which, except the last, was run on the ledge. The last was run in at right angles with the ledge, and intersected it at a distance from its mouth of about 750 ft. The

two tunnels above the lower one are each about 1,000 ft. in length. The ore is found in chutes in the fissure, which is continuous throughout, these being 100 or 150 ft. in length, and from 2 to 12 or 15 ft. in width. Immense chambers have been etched out in the mine on different levels, but there is still in sight an immense showing of ore. The ore produces gold and silver, which is found principally in sulphurets, and runs from \$20 to \$150 per ton. Specimens of rich rock from the lower tunnel have assayed as high as \$1,500. The ledge runs nearly north and south, and pitches east, and, as it is plainly indicated on the lower tunnel, is a contact vein, the east rock being a sort of quartzite and the west a porphyry.

Ex-Senator A. Garrard owns an extension of the Dolores, which has been developed to some extent by a tunnel, from which some very rich rock has been taken.

The only appearance of life about Rockland now, is the small force of men at work in the Dolores. The houses in the once busy little town are all deserted—the express office, post-office, saloon, stores and residences—and the open doors ewing on their rusty hinges give out a most doleful and ghastly threnody.

Pine Grove

North of Rockland three or four miles is Pine Grove, which has a record of bullion production of a million and a half of dollars. Here are situated two 10-stamp mills, one of which is now at work. The principal mines are the Wilson and Wheeler—the former being the only one in which anything is doing at present. The Wilson has a tunnel about 1,500 ft. in length, and is owned by David Wilson & Sons. The tunnel is but 200 or 250 ft. below the surface at any point. Sixty ft. below this tunnel, however, another tunnel is being run. The ore in this mine is found in successive chambers. The ledge formation is very wide, the veins of ore usually being found about four ft. in width, on the hanging wall. The mine is worked on the tribute system—that is, the miners pay a certain fixed price for working the ore, and the owners receive a proportion of the profits above the cost of milling. The Wheeler has been a large producer, but at present work is suspended on that property. The town of Pine Grove appears to be a thriving little community. No whisky is allowed to be sold in the place. All work is suspended on Sunday, and but for the isolation from the main routes of travel, it might be a very pleasant place to live.

There are several other districts of more or less importance in northern Esmeralda—including Washington district and Mount Grant, and the prospects for extensive operations in that section at no distant day are remarkably good.

Belmont and Adjoining Districts.

It would be a good thing, says the Belmont *Courier*, if the owners of closed down mines in this and adjoining districts would dispose of them to parties who are willing to develop them in a thorough manner. It has been the custom in this country to coyote under the grass roots, and after working out the ore above water level, close down for an indefinite period. Tybo (at one time one of the liveliest bullion-producing camps in Nevada) is under a cloud just now from this ruinous system of working, and Tybo has as good mines as any in the country if the company will only develop them properly. Belmont is pretty much in the same fix. There is only one company working at present—the Belmont. Work in this mine is progressing satisfactorily and a good quantity of fair ore is being extracted from the stapes. The concentrating mill will soon be ready to start operations. Depth is necessary to develop the mines, both here and in Tybo, and to attain this a large shaft must be sunk and heavy machinery put up. Jefferson is almost as quiet as a graveyard from the effects of mismanagement, and yet there are mines there that ought to be paying handsome dividends instead of being shut down. Ophir canyon is in the same fix as Jefferson, and yet before the fault occurred in the ledge, hundreds of thousands of dollars were taken out of the mines there. At Grantsville the mines are being opened in a thorough and systematic manner, just as mines always should be opened. The Alexander company will soon have 40 stamps pounding away on ore from this celebrated mine, and there is enough of it already exposed to keep this mill running for the balance of our natural lives. The Rockliffe company is erecting hoisting works on its valuable property, and it is the intention to sink a shaft and thoroughly develop the mine. These mines have never been assessed. The mines at Morey are being worked in a satisfactory manner with flattering results. The Rockliffe mine at Spanish belt is opening up splendidly and promises to develop into one of the biggest mines in eastern Nevada. In Philadelphia district if two or three companies will unite and sink a combination shaft they will undoubtedly open up bodies of ore that will make handsome returns to the stockholders for the outlay. Mining men of acknowledged ability are satisfied that the mines of this district can be profitably worked to a great depth.

PANORAMA AND COUNCIL.—A. F. Powers, one of the largest mine owners in Butte county, has purchased the right to use Francher's amalgamator on any mining ground that he has. He made the purchase after having given it a thorough trial and finding that it would be just what his interests claimed that it would be. —*Oreville Mercury.*

MECHANICAL PROGRESS.

WELDING BY PRESSURE.—M. Spring still continues his researches on welding by pressure. He has already submitted more than 80 solid spherized bodies to pressures ranging as high as 150,000 pounds per square inch at various temperatures. The results, which have an important bearing upon geology and mineralogy, are of considerable interest. He has found that all crystalline bodies proved capable of welding, and in the case of bodies accidentally amorphous the compressed block showed crystalline fracture—crystallization had been brought about by pressure. Softness favors the approximation of the particles and their tendency to their placing themselves in the direction of the axis of crystallization. The amorphous bodies, properly so called, fall into two groups, one of substances like wax, which weld easily, and the other of substances like amorphous carbon, which do not weld. The general result is that the crystalline state favors the union of solid bodies, but the amorphous state does not always hinder it. Prismatic sulphur is changed by compression to octahedric sulphur; amorphous phosphorus seems to be changed to metallic, and other amorphous bodies change their state. In all cases the body is changed into a denser variety, whence may be inferred that the state taken by matter is in relation to the volume it is obliged to occupy under action of external forces.

A NEW SCREW.—It is a well-known fact that the great bulk of the screws used are driven in with the hammer, and given a turn or two with screw-driver, to bring them flush. Recognizing this fact, an ingenious inventor for many years has been working upon a new screw, which is adapted for driving, and which enters the wood without tearing the grain. The gimlet point is dispensed with, and a cone point substituted. The thread has such a pitch that it drives in with barb fashion, offering no resistance in entering, but firmly resisting all attempts to withdraw it except by turning it out with the screw-driver. The head is flat, but in setting it up two nipples, or square shouldered projections, are raised in it by the one operation. The screw-driver takes hold of them more easily than it does of the customary neck, and holds quite as firmly, and when driven flush the projections on the head are not in the way, and do not disfigure it. It is claimed that this screw can be made one-third cheaper than ordinary screws, the principal saving being effected in the doing away with the necessity of sawing the neck in the head.—*Design and Work.*

PUDDLING OF IRON.—Mr. E. Harris, the President of the South Staffordshire Mill and Forge Managers' Association, in a paper which he has just read before the institute on the puddling of iron, said that the schemes tried to prevent smoke, save fuel, etc., might be counted by scores, but none of the recipes had been so effectual as to secure a general adoption. It was a mistaken theory to suppose that because iron was fibrous in the puddled bar it would be fibrous in the finished bar. Often enough the puddled bar was crystallized, and no matter how many times this class of iron was worked over again, fibers could not be developed. The "hot short" iron was as much to be guarded against as the "cold short," for whilst the engineer in constructing a bridge or building a vessel dreaded the "cold short" iron, the blacksmith and the boiler-maker equally feared the "hot short."

The use of blowers under steam boilers is being gradually abandoned. The disadvantages are numerous. It requires a larger amount of power to run them, and unless the mill is situated away from other buildings causes great annoyance and danger from sparks and cinders. A plating mill at the South End, Boston, was set on fire five times in as many years by sparks. Another mill was set on fire, caused by back draft into the boiler-room. The action of the blast on the crown sheet of boilers is like a blow-pipe, always striking in the same spot, and it is safe to say boilers will last double the time running by natural draft. A mill near Boston started with blowers under six new boilers, and had to renew the crown sheets within two years' time.

SIZE OF GOVERNOR PULLEYS.—The *Manufacturer and Builder* gives the following rule for fixing the size of governor pulleys: To find the diameter of the governor shaft pulley, multiply the number of revolutions of the engine by the diameter of the engine shaft pulley, and divide the product by the number of revolutions of the governor. To find the diameter of the engine shaft pulley, multiply the number of revolutions of the governor by the diameter of the governor shaft pulley, and divide the product by the number of revolutions of the engine.

A REMARKABLE CASTING.—The most novel exhibit shown at the Brussels national exhibition by the Seraing works is a certainly remarkable casting. It consists of what is practically the whole cast-iron work of a marine engine, with a pair of cylinders about 20 inches in diameter by 20 inches stroke, cast in one piece—bed-plate, condenser, air and feed and bilge pumps, standards, cylinders and exhaust pipe.

HOT POLISHED SHAFTING.—Since the early part of 1876 the Akron Iron Co., of Ohio, have given much attention to the manufacture of hot polished shafting by a process which, while it yields a product possessing important advantages, is such that only the best raw material can be employed. This fact is in itself a guarantee against any inferiority in the shafting turned out, and has contributed to its growing popularity with the manufacturers of agricultural implements, in the construction of which light—and, therefore, strong—parts are eminently a necessary factor. The process of the manufacture of hot polished shafting affords special facilities for turning out true work, and for making it to the gauge desired without having recourse to the lathe. A circumstance which makes the product of the improved process particularly suitable for line and counter shafting, is that it does not spring or warp in key seating. The well-known effect of polishing iron at an elevated temperature—that which gives Russia sheet iron its peculiar blue finish—is produced by the process adopted in this case. A magnetic oxide, adhering firmly, is superficially formed, affording protection against the formation of rust. We have had occasion to examine specimens of the shafting referred to, which show in a characteristic manner the presence of the coating thus obtained, and which, in conjunction with the other peculiarities noticed, render it worthy of the attention of those interested.

DIFFICULT CASTINGS.—The Ames Manufacturing Company of Chicopee are making some of the most difficult iron castings ever attempted in this country, in the shape of engine tubs for the Seymour Paper Company of Windsor Locks, Conn. One was made a few weeks ago, and a second has just been turned out, both jobs being accomplished without accident. The tubs are nineteen ft. long, eight and a half ft. wide, and thirty-two inches deep, the sides and bottom averaging about seven-eighths of an inch thick. They have heretofore been made in four pieces and riveted together, as it was thought impossible to make the whole in one casting. Many old molders, hearing that the work was to be undertaken, prophesied a failure, and iron-workers from as far off as Pittsburg, Penn., came to see the first tub cast. The Seymour Company are to have several more made, believing that though they cost a good deal to make and to handle, they will last, when once in place, as long as the mill stands. The Ames Company are to be congratulated on their success, as the work was very difficult. Eight tons of metal had to be melted for each tub, and a weight of 45 tons was piled upon the cope or covering to hold it down when the iron was poured into the big mold.—*Paper World.*

RENDERING IRON FIRE PROOF.—Iron, as is well known, is in some respects the very best material that can enter into the construction of a building, and in other respects it is the worst; of the latter phase we would speak. It is hardly necessary to refer to the fact that iron pillars and joists are very susceptible to the influence of heat, and that a fire of small magnitude will soon warp and twist them to such an extent that the fall of the whole structure becomes a certainty. Iron will endure pressure and strain under ordinary circumstances, but will quickly succumb to the influence of heat. To guard against this and to place it in the front rank of materials used in construction, it is proposed, with reason, too, that in all buildings in which iron is a factor, that it be encased in some non-conductor of heat. Terra-cotta has been suggested as the remedy. It may detract from the appearance, but that should be subsidiary to safety. If iron can be rendered a salamander it is certain to rise in favor, because it possesses all the other desirable properties required in the construction of buildings—lightness, strength and beauty.—*Insurance World.*

SHOULD SAND BE USED IN WELDING?—A correspondent of the *Blacksmith and Wheelwright*, writing from Glen Falls, N. Y., says: "The rule among smiths generally seems to be that the more sand they can get on in welding the better, the idea being that the iron will be heated more evenly by this process. Some time ago I got out of sand and could get no more for a time. After I had worked a while without it I did not want any more, and have not used it since. Some of the reasons for not using it I will name. The forging is cleaner, and it takes less time to do work without than with sand. I have done just as good work since I stopped using it as before, and have done it in less time. I would like the opinion of the trade on this subject. If it can be shown that there are reasons for using sand which will more than balance the reasons for not using it, I shall be glad to know them. The sand used by smiths here is from molders' castings."

NOTES ON STEEL.—Steel merely hardest is hardened on the surface, while in steel that has been tempered the exterior is the softest. In the one case because the surface was cooled in advance, in the other because it was heated in advance. Steel which has rusted can be cleaned by brushing with a paste composed of $\frac{1}{2}$ oz. cyanide potassium, $\frac{1}{2}$ oz. castile soap, 1 oz. whiting, and water sufficient to form a paste. The steel should first be washed with a solution of $\frac{1}{2}$ oz. cyanide potassium in 2 ozs. water.

SCIENTIFIC PROGRESS.

Gould's Comet.

Prof. Klinkerfues, of Gottingen, has published a letter on Gould's comet, discovered last February at Cordova. His object is to point out that the probable identity of this comet with those seen in 1843 and 1863 need not be rejected because it does not appear to have been seen, although so conspicuous an object between those years. So nearly does it approach the sun (within, indeed, about 100,000 miles of its surface) that the resistance to its motion when at perihelion is likely to be sufficient to produce a very considerable diminution in its period of time, the case being, in fact, one of resistance from the sun's atmosphere itself, and not merely, as has been conjectured in the case of Encke's comet, from the ethereal medium existing in space. Hence there is nothing extravagant in the supposition that the resistance of the part of the corona within which the comet passes may be quite sufficient to diminish its period of revolution from 175 years to 37 years. Carrying this view still further back, Prof. Klinkerfues contends that it is probable that the same comet may be identical with one seen and described by Aristotle in the year B. C. 371, when that philosopher was only 13 years old and still living in his birth-place, Stagira. He considered it likely that while the period of revolution from B. C. 371 to A. D. 1668 was 2,039 years, it was diminished by the resistance of the sun's atmosphere, first to 175 and then to 37 years; and, further, that it has at the late passages through perihelion been again decreased to 17 years, so that it may be expected that the comet will return in the autumn of 1897.

MALLEABLE NICKEL.—Dr. A. Fleitmann, of Iserlohn, Germany, writing to a German scientific paper, gives the most detailed account yet published in regard to his well-known method of making malleable nickel and cobalt by the addition of magnesium. Herr Fleitmann has found that nickel containing zinc is, to a certain degree, malleable, and that such an alloy can be rendered malleable by smaller proportions of magnesium. In order to make the nickel zinc alloy, the pure oxide of nickel is very thoroughly mixed with 5% of oxide of zinc, the whole being reduced to metal which contains about 4% to 5% of zinc. The presence of zinc is said to act upon the nickel in a remarkable manner, a malleable metal being produced, even without the addition of magnesium. It is likely that the brittleness of melted nickel is due to the presence of some cyanogen, and that both magnesium and cyanogen act by forming volatile cyanides, and possibly by decomposing any carbonic oxide present. After the addition of 1-20th% of magnesium, the nickel zinc alloy is claimed to become completely malleable, and to be capable of being welded both to nickel and to iron or steel. Messrs. Fleitmann & Witte have rolled sheet nickel two ft. wide and have turned out nickel-plated sheet-iron or steel. Thicker plates of nickel are welded to the iron or steel plates, heated to a high temperature, and are rolled out together in the ordinary way without scaling off. It should be noted that steel sheets true nickel-plated cannot be hardened. The nickel-plated sheets are said to take a fine polish.

THE NEW PHOTOPHONE.—The editor of *Popular Science Monthly*, in alluding to Mr. Bell's new instrument, the photophone, says: "Though it is said that light produces the effect, yet this is not strictly true; for a thick plate of India-rubber, if interposed in the path of the acting beam, intercepts all the light but still permits the passage of the radiant force which produces the sound. It is some dark ray accompanying the light proper that does the work. The experimenters have found also that other substances share with selenium the property here made available, though in a less degree. We thus have another step in the rapid progress of molecular physics and the marvelous interaction of forces which is sure to stimulate experimental inquiry, though whether it will confound past conclusions and clear up past mysteries it is impossible to say. And equally impossible it is to say whether the photophone will turn out to be of any practical use. But it is certainly unsafe to deny it. The telephone is but a thing of yesterday, and was at first supposed to be only a curious plaything. But already 'there's millions in it.' How far it is developed as a business is shown by the fact that a convention of 21 companies meets at Niagara to look after the interests of this new and rapidly extending means of intercommunication."

THE COURSE OF A LIGHTNING FLASH.—Prof. Tait, of Edinburgh, insists that when people think they see a lightning flash go upward or downward they must be mistaken. The duration of a lightning flash is less than the millionth part of a second, and the eye cannot possibly follow movements of such extraordinary rapidity. The origin of the mistake seems, he says, to be a subjective one, viz., that the central parts of the retina are more sensitive, by practice, than the rest, and therefore that the portion of the flash which is seen directly affects the brain sooner than the rest. Hence a spectator looking towards either end of a flash very naturally fancies that end to be its starting point.

Salt Lake in Ancient Times.

It is well known that the ancient water surface of the great Salt Lake of Utah once covered a vast area of country, probably more than ten times that covered by the lake at the present time. The most conspicuous vestiges of that great body of water are found in its extensive shore lines, which are, even to this day, most unmistakable in their character. It is also known by three indications that the surface of the lake was at one time fully 1,000 ft. above its present level. The lake at that early period most undoubtedly had an outlet to the ocean, and much speculation and no little research has been indulged in to fix upon the locality of this outlet, but as yet without any generally satisfactory result. The *Popular Science Monthly* sums up the results thus far as follows:

Mr. G. K. Gilbert maintained, in the *American Journal of Science* for April, 1878, that the point of overflow was Red Rock pass, Idaho, at the north end of Cache valley; that the discharging stream descended through Marsh valley, and thence continuously to the Pacific ocean; and that, flowing over soft material at first, it gradually excavated at the pass a channel more than 300 ft. deep, and lowered the level of the lake by the same amount.

Dr. A. C. Peale controverted Mr. Gilbert's conclusion in a subsequent number of the *Journal*, and held that the original altitude of the Red Rock pass was considerably below the highest level of Lake Bonneville; that the original shore line exists in Marsh valley, at the north end of the pass, as it does in Cache valley at the south; and that the real point of discharge, when the water stood at the Bonneville level, was about 45 miles north of Red Rock pass. Mr. Gilbert has, within a few months, revisited Marsh valley and Red Rock pass, and other points near the former supposed outlet of the lake, and gives in the May number of the *Journal* his reasons, derived from his later observations, for adhering to his former conclusions.

He assumes to determine the character of the body of water which has occupied a given spot, whether it was a stream or a lake, from the nature of the terraces left in the valley. There are stream-terraces, and wave-terraces, and delta-terraces, and others, all marked by distinct features. A lake should leave wave-terraces or delta-terraces. In revisiting Marsh valley, he traversed it from end to end, making a careful search for the terraces of the ancient shores, selecting the most favorable stations and lights he could get. He saw stream terraces and displacement-terraces of considerable magnitude, and a few inconspicuous terraces due to unequal erosion, but no wave-terraces and no delta-terraces. He made a special examination of two terraces referred to by Dr. Peale in support to his views, but did not recognize in them any features inconsistent with the opinion that they are stream-terraces. He consents to reconsider his original location of the outlet of the lake at the time of the beginning of the overflow, and assigns it to a position two miles north of Red Rock.

Mr. Gilbert Thompson, an expert topographer, visited the northern limits of the lake in 1877, while ignorant of the results of Mr. Gilbert's examination, and came to the same conclusion that he had reached.

A CURIOUS fact has been brought out by the examination of the artificial diamonds obtained by Mr. Hanney, to the effect that nitrogen was present in chemical combination with the carbon. Mr. Hanney is inclined, therefore, to believe that his diamonds were formed by the decomposition of a nitrogenous body, and not by the decomposition of the hydro-carbon. The diamonds, moreover, were not found when nitrogen was absent; but the successful experiments are still too few, and the evidence too vague, to justify drawing any conclusions on this subject.

A NEW SHADE FOR ELECTRIC LIGHTS.—A French inventor, M. Clemandot, has devised a shade for reducing the glare of electric lights, which he claims to be much more economical than ground glass globes. He makes his lantern of glass tubes filled with finely spun glass threads or glass wool. By reflection from the glass threads the light is given the desired diffusion, with a loss of illuminating power not exceeding 15%, against 30% or 40% with opal or ground glass. The natural blueness of the electric light can be corrected by tinting the glass tubes or the inclosed wool.

An improved method of stopping engines, says the *Electrician*, has recently been devised. The main object of the device is to enable any child or unskilled persons in any part of a mill to stop the engine in case of accident. The action is exceedingly simple. By touching a spring similar to the spring of an electric bell, an electric ball is set in motion. The ball drops and shuts one of the valves, which prevents the steam from escaping, and the engine is brought to a stand-still.

PHOSPHORESCENT LIGHTNING.—Dr. Phipson takes sulphide of barium, or some other substance which is rendered phosphorescent by the solar rays, and incloses it in a Gessler tube, through which he passes a constant electric current of a feeble but regular intensity. He claims to obtain in this manner a uniform and agreeable light, at a cost lower than that of gas.—*Les Mondes.*



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Columbus Mining District, Nevada.—No. 2.

[From our Traveling Correspondent.]

EDITORS PRESS:—Nature seems always to follow some general plan. In this sense, her laws are invariable. There is, however, usually a certain pleasing variety in her operations, caused often by very slight differences in surrounding conditions. The Comstock—if rightly apprehended—is one vast mineral zone, the ore being found in veins or chimneys in the midst of the interlying porphyry, and holding a course somewhat parallel at the different depths attained. Such is the case with the ore veins of Candelaria, with this difference, however, that here they are, perhaps, better marked and the ore bodies more readily traced. But at this point the parallel ceases. The Comstock is a well determined contact vein or lode. What may be the nature or the proper designation of the lode or vein of this section, is a question that probably yet remains to be decided. In the light of present developments, there is little reason to pronounce them true fissures in any ordinary use of the term. They are in most cases too well defined to be styled bedded veins, such as are frequently found in the limestone. And there is as yet no very clear evidence of a contact between different formations. There is a rock, it is true, unlike the slate formation at one point on the north, that juts part way into the zone. It looks more like a talc-slate than clay slate; might be taken for a variety of slate, or for one of the forms of hornblende. It is barely possible that this magnesian rock may hereafter be found to extend, and form, as some think, the northern boundary of the belt; and thus stamp it a contact lode, its general similarity to the Comstock suggesting such an inference. One thing is certain. Nothing anomalous has ever yet been written in the great book of nature. If we fail to understand, it must be set down to lack of sufficient data or capacity to read and interpret aright. But what matters it whether it is a contact, bedded vein, true fissure or what not, so long as good ore holds out as now on the lowest levels reached, or while a million of bullion or more is annually shipped, and

Northern Belle

Continues to gladden so many hearts and homes with her regular monthly dividends. Nor is this all. Other mines promise soon to be put on a paying basis.

The Mount Diablo

In particular may be mentioned as a star of the first magnitude, just now beginning to appear above the horizon. The mine is very favorably located south of the dyke previously alluded to, immediately above Metallic City, and a mile from Candelaria. It ranks next to Northern Belle in bullion production. A very considerable amount was extracted years ago, one excavation, near the surface, yielding as much as \$498,000. The present depth of double compartment shaft is 365 ft. Levels are opened at the 150, 250 and 350-ft. stations. Now drifting and stopping on the first and second levels—the first producing about 45 tons per day. A very fine body of ore is understood to have been struck not long since on the second level. The third level has been run 120 ft., and has yet to make about 40 ft. more before cutting the lode. The entire width of ore and ledge matter together is fully 250 ft.

The best pay ore on the 150-ft. level is from 2 to 10 ft. wide, averaging \$100 per ton. The best, if assorted, would yield as much as \$700. On this level there are hundreds, if not thousands of tons, of lower-grade ore that can be made to pay a profit with cheaper mining and milling facilities. The company is now shipping at the rate of 60 tons per day to one of the Northern Belle mines, the result of which will probably soon be heard from.

Anticipations as to the future of the mine are at present running high. Many supposed to be well posted, are of the opinion that she is destined at no very distant day to rival, if not eclipse, her dividend-paying neighbor to which allusion has more than once been made. So mote it be.

The East Mount Diablo,

Adjoining the above, has had little development on the surface. Lying between the Mount Diablo on one hand and the Gen. Jackson on the other the character of the ground will soon be determined by the explorations now going on in these mines. The Mount Diablo on one of her levels is now within 120 ft. of the line, and said to have at this point a good strong vein.

The Gen. Jackson's Shaft

Is also within 150 ft. of the east line of the East Mount Diablo's ground, and as both properties belong to the same company, prospecting will be carried on simultaneously.

The Jackson incline shaft is now down 155 ft., following the vein.

About 35 tons of ore, looked upon as first-class have been taken out, estimated to mill \$100 per ton, and the mine is considered a fine prospect.

The Candelaria (No. 2),

South of the Gen. Jackson and East Mount Diablo, has recently struck very fair ore. Shaft, 80 ft. deep and drift on lode, 130 ft.

The Mountain Girl,

The property of Messrs. Sutherland, Murphy, and McLane, is situated due east of the Mount Diablo hoisting works. It is the first extension of the Denero or the famous Mountain Boy lode. Shaft now down 230 ft., and work rapidly pushed with two shifts.

The owners are very sanguine as to results.

The Windsor,

North of the Jackson, some years ago extracted ore that milled as high as \$300 per ton. Very good ore is said to have been found at the depth of 160 ft., the shaft on the way down, cutting veins from 8 to 10 inches wide, the ore giving assays from \$20 up to \$300 per ton.

The Saratoga,

Near the Windsor, is at present taking out ore worth \$300 per ton, assay value. Preparations are making to erect machinery.

The Eastern Belle,

Running parallel with the Windsor, has a shaft 150 ft., a north drift 150 ft., and one south 170 ft., both through vein matter, but neither cutting the lode. An incline on the vein struck ore at the depth of 50 ft., that assays from \$20 to \$40.

The New England,

Some distance further east, comprises several claims, being 1,500 ft. long by 1,400 ft. wide. It has been opened by shaft 120 ft., by incline, tunnel, winze and drifts, developing ore bodies in different parts of the claim. The ore, as to character, is classed as chloride and manganese. About \$6,000 worth was extracted at one point, working from \$250 to \$300 per ton. The mine is now being worked through a shaft and incline aggregating a depth of 130 ft., from which level an east drift has cut a body of ore, the extent and value of which are not yet known, two assays going respectively \$113 and \$212 per ton.

On the Columbus side of the mountain, W. J. Sutherland, Esq., has recently had some claims incorporated under the name of

The Highland Chief.

The ore is represented to be rich and the prospects unusually flattering.

The Tilden,

One mile from the town of Columbus, was discovered as early as 1869, and yielded soon after a very considerable amount of bullion. It lies in the granite, and the rock is understood to be more than ordinarily rich. It has been relocated, and the work is expected to be vigorously prosecuted. On account of the water to be banded, hoisting works will be required.

Having now given a brief sketch of most of the principal mines of this great mineralized zone, it may be well to give some account of

The Two Great Drawbacks

To successful operations in the district, more particularly at the west end. Wood and water are both scarce and dear. Water sells at from 5 to 6 cents per gallon—is hauled from Belleville and Columbus, the distance of from 8 to 10 miles. When it is remembered that there are thousands upon thousands of tons of low-grade ore here, which could be made to pay with mills on the ground and cheap power for hoisting purposes, the magnitude of these drawbacks must be at once apparent.

Proposed Remedy.

It is understood that a franchise has been granted to a company to supply Candelaria with water. The source of supply is from springs about 10 miles distant. The company claims to be able to furnish 15 times the amount now used—a sufficiency not only for family use, but for all milling and mining purposes. The water has been tapped by a tunnel 1,000 ft. in length. The estimated cost is put somewhere from \$40,000 to \$50,000. It is understood, also, that an abundant supply of water can be obtained from another source, if needed. It will cost something more, the distance being greater. Scarcity of wood will be remedied as soon as the narrow-gauge railroad reaches Candelaria, and much of the ore can be shipped to Carson river or other points to be worked, if a sufficient number of mills are not in the meantime constructed for the purpose on the ground.

A. C. K.

MOUNT GRANT.—All that region of mountainous country, on and about Mt. Grant, Esmeralda county, Nev., bears the same name as the mountain peak, and still there is a vast difference in the mineral character of the country within the space of a very few miles. For instance, on and about Mt. Grant proper, as well as about Squaw creek, a short distance from it, all the gold and silver-bearing ores are more or less mixed with base metals, while between the two lies a belt of free gold ore. On this middle belt, six miles south of the foot of Walker lake, and seven miles south of the proposed town of Milbrae, which is to be the shipping point for Bodie from the Carson and Colorado railroad, is located the Golden Eagle mine, owned, in part, by Bodieites, and near this is the somewhat famous Big Indian mine, both containing large quantities of free gold ore of high grade. The Big Indian people have sent to the Comstock to purchase a mill, having an abundance of ore in sight. The Golden Eagle has also a large quantity of high-grade ore in sight, and several other claims on the "free belt" have fine prospects.—*Bodie Standard-News.*

Northern Esmeralda.

Revival of Operations in Old Camps.

A representative of the *Bodie Free Press* spent last week in the northern portion of Esmeralda county, Nevada, about 50 miles north of Bodie, and about 60 miles south of Virginia City, visiting Cambridge, Rockland, Pine Grove and other points.

The most extensive mining operations now in progress in northern Esmeralda are at Cambridge, at which point is situated two or three series of ledges and a 10-stamp mill. Most of the mines and the mill are the property of ex-Gov. H. G. Blasdel, and are under the immediate personal supervision of Col. S. W. Blasdel. The mines are located in a low range of granite hills, running northerly and southerly, which rise up from the plain between the range of mountains in which is situated Pine Grove and Rockland to the west, and the range of which Mount Grant is the principal peak to the east. The Cambridge mines have been worked to some extent for 15 or 20 years past, their discovery dating prior to that of the Comstock lode. Numerous shafts have been sunk to a depth of from 100 to 150 ft., and the Wheeler Bros., who owned largely in the district years ago, when it was known as the Salt River district, erected a small mill on the banks of the East Walker river and worked the ores with more or less success. The ores are, except those taken from the Blackhorse mine, low grade and somewhat difficult to treat successfully. They contain copper, galena and iron in carbonate and other forms. In the precious metals gold largely predominates over silver.

A little over a year ago Gov. Blasdel purchased the mines, which comprised the Williams, Blasdel, Walker River, Black Horse and El Dorado, together with a ranch of bottom land on Walker river, about a mile distant from the mines. He replaced the old Wheeler affair with a 10-stamp mill of the modern sort, fully appointed with all the latest appliances, and a model of convenience and economy in working. It is run by water power, supplied by a large race from the Walker river, about three-quarters of a mile in length, from which, also, water is supplied to irrigate the ranch. In connection with the mill are two large boilers, used merely to supply steam for the pans, an office, assay office, retort room and manager's residence.

The mines are on three parallel ledges, about 1,000 or 1,500 ft. apart, and are each 600x1,500 ft. Each of the ledges shows separate and distinct characteristics, the Williams ledge showing the greatest tendency to shaleness, and the Black Horse being the nearest free milling. The latter vein contains very rich ore, which is found in successive kidney-shaped chimneys. Its color is usually a reddish brown, and free gold can be seen on nearly every piece. The ledges are traceable on the surface for a mile, or even a greater distance. The granite formation is of a highly silicious character, and is filled with mica. The mines are easily worked, and there being a steady grade thence to the mill, ore is transported for reduction at a very light expense. The mill was completed last year, hut, with the exception of a few experimental runs, has not been put to work regularly until this season. Some difficulty has been experienced in securing the services of an amalgamator competent to work the ores, containing as they do bases of various kinds. Dr. Matthews, who has a very extensive fund of scientific knowledge, is now attending to this work, and is meeting with considerable success.

The Virginia and Bodie line of stages runs up to the Cambridge postoffice, which is in charge of Wells, Fargo & Co.'s office, which is in charge of Capt. J. H. Williams, as postmaster and express agent. Capt. Williams owns a mine known as the Reese; Capt. Williams and E. R. Willis the Willis mine, and E. R. Willis the Summit.

The situation of the mill and ranch is very pleasant to the eye. Shut in on every side with low granite hills, the mountains further away forming a dark background, the willow-banked river running through the green meadows impart to the place the character of an oasis in the desert. It is 2,000 or 3,000 ft. lower than Bodie, and the climate is correspondingly mild, snow in the winter time seldom remaining on the ground more than an hour or two. Altogether Cambridge, while being a peculiarly pleasant place of residence, gives promise of becoming a profitable bullion-producing region.

Rockland.

About eight miles to the west of Cambridge, in the same range of mountains in which is situated Pine Grove, is Rockland, a camp which years ago was a lively one, as its little graveyard, in which 8 or 10 were buried with their boots on, fully attests. The principal mine in this district is the Dolores, from which has been produced about \$200,000. This mine was purchased by Gov. Blasdel four or five years ago, and a 10-stamp mill was erected by him. The fact that no snow fell for two or three years, caused such a drought that sufficient water could not be obtained to run the mill. As a consequence, operations have been almost suspended in the district since that time, with the exception, perhaps, of a little prospecting. Work has been resumed on the Dolores mine this summer, and Col. Blasdel has taken out some ore and shipped it to the Cambridge mill for reduction. The mine has been developed by six different tunnels in the mountain about 100 ft. apart, all of which, except the last, was run on the ledge. The last was run in at right angles with the ledge, and intersected it at a distance from its mouth of about 750 ft. The

two tunnels above the lower one are each about 1,000 ft. in length. The ore is found in chutes in the fissure, which is continuous throughout, these being 100 or 150 ft. in length, and from 2 to 12 or 15 ft. in width. Immense chambers have been stope out in the mine on different levels, but there is still in sight an immense showing of ore. The ore produces gold and silver, which is found principally in sulphurets, and runs from \$20 to \$150 per ton. Specimens of rich rock from the lower tunnel have assayed as high as \$1,500. The ledge runs nearly north and south, and pitches east, and, as it is plainly indicated on the lower tunnel, is a contact vein, the east rock being a sort of quartzite and the west a porphyry.

Ex-Senator A. Garrard owns an extension of the Dolores, which has been developed to some extent by a tunnel, from which some very rich rock has been taken.

The only appearance of life about Rockland now, is the small force of men at work in the Dolores. The houses in the once busy little town are all deserted—the express office, post-office, saloons, stores and residences—and the open doors swinging on their rusty hinges give out a most doleful and ghostly threnody.

Pine Grove.

North of Rockland three or four miles is Pine Grove, which has a record of bullion production of a million and a half of dollars. Here are situated two 10-stamp mills, one of which is now at work. The principal mines are the Wilson and Wheeler—the former being the only one in which anything is doing at present. The Wilson has a tunnel about 1,500 ft. in length, and is owned by David Wilson & Sons. The tunnel is but 200 or 250 ft. below the surface at any point. Sixty ft. below this tunnel, however, another tunnel is being run. The ore in this mine is found in successive chambers. The ledge formation is very wide, the veins of ore usually being found about four ft. in width, on the hanging wall. The mine is worked on the tribute system—that is, the miners pay a certain fixed price for working the ore, and the owners receive a proportion of the profits above the cost of milling. The Wheeler has been a large producer, but at present work is suspended on that property. The town of Pine Grove appears to be a thriving little community. No whisky is allowed to be sold in the place. All work is suspended on Sunday, and but for the isolation from the main routes of travel, it might be a very pleasant place to live.

There are several other districts of more or less importance in northern Esmeralda—including Washington district and Mount Grant, and the prospects for extensive operations in that section at no distant day are remarkably good.

Belmont and Adjoining Districts.

It would be a good thing, says the *Belmont Courier*, if the owners of closed down mines in this and adjoining districts would dispose of them to parties who are willing to develop them in a thorough manner. It has been the custom in this country to coyote under the grass roots, and after working out the ore above water level, close down for an indefinite period. Tybo (at one time one of the liveliest bullion-producing camps in Nevada) is under a cloud just now from this ruinous system of working, and Tybo has as good mines as any in the country if the company will only develop them properly. Belmont is pretty much in the same fix. There is only one company working at present—the Belmont. Work in this mine is progressing satisfactorily and a good quantity of fair ore is being extracted from the stopes. The concentrating mill will soon be ready to start operations. Depth is necessary to develop the mines, both here and in Tybo, and to attain this a large shaft must be sunk and heavy machinery put up. Jefferson is almost as quiet as a graveyard from the effects of mismanagement, and yet there are mines there that ought to be paying handsome dividends instead of being shut down. Ophir canyon is in the same fix as Jefferson, and yet before the fault occurred in the ledge, hundreds of thousands of dollars were taken out of the mines there. At Grantsville the mines are being opened in a thorough and systematic manner, just as mines always should be opened. The Alexander company will soon have 40 stamps pounding away on ore from this celebrated mine, and there is enough of it already exposed to keep this mill running for the balance of our natural lives. The Brooklyn company is erecting hoisting works on its valuable property, and it is the intention to sink a shaft and thoroughly develop the mine. These mines have never been assessed. The mines at Morey are being worked in a satisfactory manner with flattering results. The Barcelona mine at Spanish held is opening up splendidly and promises to develop into one of the highest mines in eastern Nevada. In Philadelphia district if two or three companies will unite and sink a combination shaft they will undoubtedly open up bodies of ore that will make handsome returns to the stockholders for the outlay. Mining men of acknowledged ability are satisfied that the mines of this district can be profitably worked to a great depth.

FANCHER'S AMALGAMATOR.—O. P. Powers, one of the largest mine owners in Butte county, has purchased the right to use Fancher's amalgamator on any mining ground that he has. He made the purchase after having given it a thorough trial and finding that it would do just what its inventor claimed that it would do.—*Oroville Mercury.*

MECHANICAL PROGRESS.

WELDING BY PRESSURE.—Mr. Spring still continues his researches on welding by pressure. He has already submitted more than 80 solid pulverized bodies to pressures ranging as high as 150,000 pounds per square inch at various temperatures. The results, which have an important bearing upon geology and mineralogy, are of considerable interest. He has found that all crystalline bodies proved capable of welding, and in the case of bodies accidentally amorphous the compressed block showed crystalline fracture—crystallization had been brought about by pressure. Softness favors the approximation of the particles and their tendency to their placing themselves in the direction of the axes of crystallization. The amorphous bodies, properly so called, fall into two groups, ones of substance like wax, which weld easily, and the other of substances like amorphous carbon, which do not weld. The general result is that the crystalline state favors the union of solid bodies, but the amorphous state does not always hinder it. Prismatic sulphur is changed by compression to octahedric sulphur; amorphous phosphorus seems to be changed to metallic, and other amorphous bodies change their state. In all cases the body is changed into a denser variety, whence may be inferred that the state taken by matter is in relation to the volume it is obliged to occupy under action of external forces.

A NEW SCREW.—It is a well-known fact that the great bulk of the screws used are driven in with the hammer, and given a turn or two with a screw-driver, to bring them flush. Recognizing this fact, an ingenious inventor for many years somewhat prominently identified with the business, has brought out a new screw, which is adapted for driving, and which enters the wood without tearing the grain. The gimlet point is dispensed with, and a cone point substituted. The thread has such a pitch that it drives in barb fashion, offering no resistance in entering, but firmly resisting all attempts to withdraw it except by turning it out with the screw-driver. The head is flat, but in setting it up two nipples, or square shouldered projections, are raised in it by the one operation. The screw-driver takes hold of them more easily than it does of the customary nick, and holds quite as firmly, and when driven flush the projections on the head are not in the way, and do not disfigure it. It is claimed that this screw can be made one-third cheaper than ordinary screws, the principal saving being effected in the doing away with the necessity of sawing the nick in the head.—*Design and Work.*

PUDDLING OF IRON.—Mr. E. Harris, the President of the South Staffordshire Mill and Forge Masters' Association, in a paper which he has just read before the institute on the puddling of iron, said that the schemes tried to prevent smoke, save fuel, etc., might be counted by scores, but none of the recipes had been so effectual as to secure a general adoption. It was a mistaken theory to suppose that because iron was fibrous in the puddled bar it would be fibrous in the finished bar. Often enough the puddled bar was crystallized, and no matter how many times this class of iron was worked over again, fibers could not be developed. The "hot short" iron was as much to be guarded against as the "cold short," for whilst the engineer in constructing a bridge or building a vessel dreaded the "cold short" iron, the blacksmith and the boiler-maker equally feared the "hot short."

The use of blowers under steam boilers is being gradually abandoned. The disadvantages are numerous. It requires a larger amount of power to run them, and unless the mill is situated away from other buildings causes great annoyance and danger from sparks and cinders. A planing mill at the South End, Boston, was set on fire five times in as many years by sparks. Another mill was set on fire, caused by back draft into the boiler-room. The action of the blast on the crown sheet of boilers is like a blow-pipe, always striking in the same spot, and it is safe to say boilers will last double the time running by natural draft. A mill near Boston started with blowers under six new boilers, and had to renew the crown sheets within two years' time.

SIZE OF GOVERNOR PULLEYS.—The *Manufacturer and Builder* gives the following rule for fixing the size of governor pulleys: To find the diameter of the governor shaft pulley, multiply the number of revolutions of the engine by the diameter of the engine shaft pulley, and divide the product by the number of revolutions of the governor. To find the diameter of the engine shaft pulley, multiply the number of revolutions of the governor by the diameter of the governor shaft pulley, and divide the product by the number of revolutions of the engine.

A REMARKABLE CASTING.—The most novel exhibit shown at the Brussels national exhibition by the Sraing works is a certainly remarkable casting. It consists of what is practically the whole cast-iron work of a marine engine, with a pair of cylinders about 20 inches in diameter by 20 inches stroke, cast in one piece—head-plate, condenser, air and feed and bilge pumps, standards, cylinders and exhaust pipe.

HOT POLISHED SHAFTING.—Since the early part of 1876 the Akron Iron Co., of Ohio, have given much attention to the manufacture of hot polished shafting by a process which, while it yields a product possessing important advantages, is such that only the best raw material can be employed. This fact is in itself a guarantee against any inferiority in the shafting turned out, and has contributed to its growing popularity with the manufacturers of agricultural implements, in the construction of which light—and, therefore, strong—parts are eminently a necessary factor. The process of the manufacture of hot polished shafting affords special facilities for turning out true work, and for making it to the gauge desired without having recourse to the lathe. A circumstance which makes the product of the improved process particularly suitable for line and counter shafting, is that it does not spring or warp in key seating. The well-known effect of polishing iron at an elevated temperature—that which gives Russia sheet iron its peculiar blue finish—is produced by the process adopted in this case. A magnetic oxide, adhering firmly, is superficially formed, affording protection against the formation of rust. We have had occasion to examine specimens of the shafting referred to, which show in a characteristic manner the presence of the coating thus obtained, and which, in conjunction with the other peculiarities noticed, render it worthy of the attention of those interested.

DIFFICULT CASTINGS.—The Ames Manufacturing Company of Chicopee are making some of the most difficult iron castings ever attempted in this country, in the shape of engine tube for the Seymour Paper Company of Windsor Locks, Conn. One was made a few weeks ago, and a second has just been turned out, both jobs being accomplished without accident. The tube is nineteen ft. long, eight and a half ft. wide, and thirty-two inches deep, the sides and bottom averaging about seven-eighths of an inch thick. They have heretofore been made in four pieces and riveted together, as it was thought impossible to make the whole in one casting. Many old molders, hearing that the work was to be undertaken, prophesied a failure, and iron-workers from as far off as Pittsburg, Penn., came to see the first cast. The Seymour Company are to have several more made, believing that though they cost a good deal to make and to handle, they will last, when once in place, as long as the mill stands. The Ames Company are to be congratulated on their success, as the work was very difficult. Eight tons of metal had to be melted for each tub, and a weight of 45 tons was piled upon the cope or covering to hold it down when the iron was poured into the big mold.—*Paper World.*

RENDERING IRON FIRE PROOF.—Iron, as is well known, is in some respects the very best material that can enter into the construction of a building, and in other respects it is the worst; of the latter phase we would speak. It is hardly necessary to refer to the fact that iron pillars and joists are very susceptible to the influence of heat, and that a fire of small magnitude will soon warp and twist them to such an extent that the fall of the whole structure becomes a certainty. Iron will endure pressure and strain under ordinary circumstances, but will quickly succumb to the influence of heat. To guard against this and to place it in the front rank of materials used in construction, it is proposed, with reason, too, that in all buildings in which iron is a factor, that it be encased in some non-conductor of heat. Terra-cotta has been suggested as the remedy. It may detract from the appearance, but that should be subsidiary to safety. If iron can be rendered a salamander it is certain to rise in favor, because it possesses all the other desirable properties required in the construction of buildings—lightness, strength and beauty.—*Insurance World.*

SHOULD SAND BE USED IN WELDING?—A correspondent of the *Blacksmith and Wheelwright*, writing from Glen Falls, N. Y., says: "The rule among smiths generally seems to be that the more sand they can get on in welding the better, the idea being that the iron will be heated more evenly by this process. Some time ago I got out of sand and could get no more for a time. After I had worked a while without it I did not want any more, and have not used it since. Some of the reasons for not using it I will name. The forging is cleaner, and it takes less time to do work without than with sand. I have done just as good work since I stopped using it as before, and have done it in less time. I would like the opinion of the trade on this subject. If it can be shown that there are reasons for using sand which will more than balance the reasons for not using it, I shall be glad to know them. The sand used by smiths here is from molders' castings."

NOTES ON STEEL.—Steel merely hardest is hardened on the surface, while in steel that has been tempered the exterior is the softest. In the one case because the surface was cooled in advance, in the other because it was heated in advance. Steel which has rusted can be cleaned by brushing with a paste composed of ½ oz. cyanide potassium, ½ oz. castile soap, 1 oz. whiting, and water sufficient to form a paste. The steel should first be washed with a solution of ½ oz. cyanide potassium in 2 ozs. water.

SCIENTIFIC PROGRESS.

Gould's Comet.

Prof. Klinkorfues, of Göttingen, has published a letter on Gould's comet, discovered last February at Cordova. His object is to point out that the probable identity of this comet with those seen in 1843 and 1868 need not be rejected because it does not appear to have been seen, although so conspicuous an object between those years. So nearly does it approach the sun (within, indeed, about 100,000 miles of its surface) that the resistance to its motion when at perihelion is likely to be sufficient to produce a very considerable diminution in its periodic time, the case being, in fact, one of resistance from the sun's atmosphere itself, and not merely, as has been conjectured in the case of Encke's comet, from the ethereal medium existing in space. Hence there is nothing extravagant in the supposition that the resistance of the part of the corona within which the comet passes may be quite sufficient to diminish its period of revolution from 175 years to 37 years. Carrying this view still further back, Prof. Klinkorfues contends that it is probable that the same comet may be identical with one seen and described by Aristotle in the year B. C. 371, when that philosopher was only 13 years old and still living in his birth-place, Stagira. He considered it likely that while the period of revolution from B. C. 371 to A. D. 1668 was 2,039 years, it was diminished by the resistance of the sun's atmosphere, first to 175 and then to 37 years; and, further, that it has at the late passages through perihelion been again decreased to 17 years, so that it may be expected that the comet will return in the autumn of 1897.

MALLEABLE NICKEL.—Dr. A. Fleitmann, of Iserlohn, Germany, writing to a German scientific paper, gives the most detailed account yet published in regard to his well-known method of making malleable nickel and cobalt by the addition of magnesium. Herr Fleitmann has found that nickel containing zinc is, to a certain degree, malleable, and that such an alloy can be rendered malleable by smaller proportions of magnesium. In order to make the nickel zinc alloy, the pure oxide of nickel is very thoroughly mixed with 5% of oxide of zinc, the whole being reduced to metal which contains about 4% to 5% of zinc. The presence of zinc is said to act upon the nickel in a remarkable manner, a malleable metal being produced, even without the addition of magnesium. It is likely that the brittleness of melted nickel is due to the presence of some cyanogen, and that both magnesium and cyanogen act by forming volatile cyanides, and possibly by decomposing any carbonic oxide present. After the addition of 1-20th % of magnesium, the nickel zinc alloy is claimed to become completely malleable, and to be capable of being welded both to nickel and to iron or steel. Messrs. Fleitmann & Witte have rolled sheet nickel two ft. wide and have turned out nickel-plated sheet-iron or steel. Thicker plates of nickel are welded to the iron or steel plates, heated to a high temperature, and are rolled out together in the ordinary way without scaling off. It should be noted that steel sheets thus nickel-plated cannot be hardened. The nickel-plated sheets are said to take a fine polish.

THE NEW PHOTOPHONE.—The editor of *Popular Science Monthly*, in alluding to Mr. Bell's new instrument, the photophone, says: "Though it is said that light produces the effect, yet this is not strictly true; for a thick plate of India-rubber, if interposed in the path of the acting beam, intercepts all the light but still permits the passage of the radiant force which produces the sound. It is some dark ray accompanying the light proper that does the work. The experimenters have found also that other substances share with selenium the property here made available, though in a less degree. We thus have another step in the rapid progress of molecular physics and the marvelous interaction of forces which is sure to stimulate experimental inquiry, though whether it will confound past conclusions and clear up past mysteries it is impossible to say. And equally impossible it is to say whether the photophone will turn out to be of any practical use. But it is certainly unsafe to deny it. The telephone is but a thing of yesterday, and was at first supposed to be only a curious plaything. But already 'there's millions in it.' How far it is developed as a business is shown by the fact that a convention of 21 companies meets at Niagara to look after the interests of this new and rapidly extending means of intercommunication."

THE COURSE OF A LIGHTNING FLASH.—Prof. Tait, of Edinburgh, insists that when people think they see a lightning flash go upward or downward they must be mistaken. The duration of a lightning flash is less than the millionth part of a second, and the eye cannot possibly follow movements of such extraordinary rapidity. The origin of the mistake seems, he says, to be a subjective one, viz., that the central parts of the retina are more sensitive, by practice, than the rest, and therefore that the portion of the flash which is seen directly affects the brain sooner than the rest. Hence a spectator looking towards either end of a flash very naturally fancies that end to be its starting point.

Salt Lake in Ancient Times.

It is well known that the ancient water surface of the great Salt lake of Utah once covered a vast area of country, probably more than ten times that covered by the lake at the present time. The most conspicuous vestiges of that great body of water are found in its extensive shore lines, which are, even to this day, most unmistakable in their character. It is also known by these indications that the surface of the lake was at one time fully 1,000 ft. above its present level. The lake at that early period most undoubtedly had an outlet to the ocean, and much speculation and no little research has been indulged in to fix upon the locality of this outlet, but as yet without any generally satisfactory result. The *Popular Science Monthly* sums up the results thus far as follows:

Mr. G. K. Gilbert maintained, in the *American Journal of Science* for April, 1878, that the point of overflow was Red Rock pass, Idaho, at the north end of Cache valley; that the discharging stream descended through Marsh valley, and thence continuously to the Pacific ocean; and that, flowing over soft material at first, it gradually excavated at the pass a channel more than 300 ft. deep, and lowered the level of the lake by the same amount.

Dr. A. C. Peale controverted Mr. Gilbert's conclusion in a subsequent number of the *Journal*, and held that the original altitude of the Red Rock pass was considerably below the highest level of Lake Bonnaville; that the original shore line exists in Marsh valley, at the north end of the pass, as it does in Cache valley at the south; and that the real point of discharge, when the water stood at the Bonneville level, was about 45 miles north of Red Rock pass. Mr. Gilbert has, within a few months, revisited Marsh valley and Red Rock pass, and other points near the former supposed outlet of the lake, and gives in the May number of the *Journal* his reasons, derived from his later observations, for adhering to his former conclusions.

He assumes to determine the character of the body of water which has occupied a given spot, whether it was a stream or a lake, from the nature of the terraces left in the valley. Thus there are stream-terraces, and wave-terraces, and delta-terraces, and others, all marked by distinct features. A lake should leave wave-terraces or delta-terraces. In revisiting Marsh valley, he traversed it from end to end, making a careful search for the terraces of the ancient shores, selecting the most favorable stations and lights he could get. He saw stream terraces and displacement-terraces of considerable magnitude, and a few inconspicuous terraces due to unequal erosion, but no wave-terraces and no delta-terraces. He made a special examination of two terraces referred to by Dr. Peale in support to his views, but did not recognize in them any features inconsistent with the opinion that they are stream-terraces. He consents to reconsider his original location of the outlet of the lake at the time of the beginning of the overflow, and assigns it to a position two miles north of Red Rock.

Mr. Gilbert Thompson, an expert topographer, visited the northern limits of the lake in 1877, while ignorant of the results of Mr. Gilbert's examination, and came to the same conclusion that he had reached.

A CURIOUS FACT has been brought out by the examination of the artificial diamonds obtained by Mr. Hannay, to the effect that nitrogen was present in chemical combination with the carbon. Mr. Hannay is inclined, therefore, to believe that his diamonds were formed by the decomposition of a nitrogenous body, and not by the decomposition of the hydro-carbon. The diamonds, moreover, were not found when nitrogen was absent; but the successful experiments are still too few, and the evidence too vague, to justify drawing any conclusions on this subject.

A NEW SHADE FOR ELECTRIC LIGHTS.—A French inventor, M. Clemandot, has devised a shade for reducing the glare of electric lights, which he claims to be much more economical than ground glass globes. He makes his lantern of glass tubes filled with finely spun glass threads or glass wool. By reflection from the glass threads the light is given the desired diffusion, with a loss of illuminating power not exceeding 15%, against 30% or 40% with opal or ground glass. The natural blueness of the electric light can be corrected by tinting the glass tubes or the inclosed wool.

An improved method of stopping engines, says the *Electrician*, has recently been devised. The main object of the device is to enable any child or unskilled persons in any part of a mill to stop the engine in case of accident. The action is exceedingly simple. By touching a spring similar to the spring of an electric bell, an electric hall is set in motion. The hall drops and shuts one of the valves, which prevents the steam from escaping, and the engine is brought to a stand-still.

PHOSPHORESCENT LIGHTNING.—Dr. Phipson takes sulphide of barium, or some other substance which is rendered phosphorescent by the solar rays, and includes it in a Giessler tube, through which he passes a constant electric current of a feeble but regular intensity. He claims to obtain in this manner a uniform and agreeable light, at a cost lower than that of gas.—*Les Mondes.*

MINING SUMMARY.

The Custer has 7 men at work, with a big dump of ore out and "plenty in sight." Other properties are at work with stronger forces, so that "base bullion from Inyo" will again be in order, especially as the Modock furnace is expected to start up about the same time.

require roasting, and the company being now assured of a successful mode of treatment, will erect the necessary works. This mine is improving as depth is gained. The vein is over 50 ft in width, and the pay streak is widest on the lowest levels.

ADDENDA.—It will be recollected that this mine, which runs north and south along the summit of Silver Hill, was projected to a depth of 400 ft through an incline shaft. Three levels were run from the incline, at depths respectively of 300, 350 and 400 ft. There was such marked improvement on each successive level that the company determined to sink a new vertical shaft of sufficient size and proper pattern for working to great depths. The new shaft was started about the commencement of the present year, or a little earlier. It is now 520 ft in depth, and 2 levels have been run from it at 400 and 500 ft respectively. The shaft is a 3-compartment, timbered from top to bottom with 10x10 square sets.

NEVADA.

PAY GRAVEL.—*Fort-Hill Tidings*, Oct. 8: It is reported that a cave in the Wind-Up mine, near Quaker Hill, revealed to the workmen good gravel below the tunnel.

RICH ROCK CONTINUES to be found in the Ford & Muller claim, as also in Rocky Bar.

PROGRESS AT THE PROVIDENCE.—*Nevada Transcript*, Oct. 10: The hauling works being built at the Providence mine, to take the place of the ones recently destroyed by fire, will not be completed for several days yet. The stous masons finished their part of the work yesterday, and it is expected the pump will be ready to start by next Saturday. The remainder of the machinery and the building will be put up as quickly as a large force of men can accomplish the job.

YOE BERT has it is understood that Judge Brown and his brother will make a contract with the South Yuba company soon for water with which to work their claim this winter. Should they conclude to begin washing, it will necessitate the digging of a ditch. The water would probably be conveyed across Steep Hollow by means of pipes hung to a suspension bridge. The Birdseye Creek company, who make a large clean-up a couple of weeks after the wash, are still washing. They will quit soon in order to fit up for next season's work. Some Chinese yesterday brought to the city and sold amalgam amounting to considerably over \$1,000, which they say came from a small placer claim in the vicinity of Yoe Bet.

PLACER.

GLITTERING WITH GOLD.—*Placer Herald*, Oct. 6: We mentioned last week that Roberts & Roberts, of the Central level, on Duncan Hill, were taking out some good rock. We were unaware at the time just how good it was. On Monday we were shown some samples of the ore then being extracted that astonished us. They fairly glittered with the filthy lute, and aside from the liberal showing of free gold, the general appearance of the rock was decidedly fine.

RATLESNAKE BAR.—Both river and quartz mining are busily operating here. Bates & McNeill are doing well. Mr. Zintgraf has found a new ledge larger than the original location, and quite as good. Craig & Fullerton's claim has not yet made a showing, but they have good ground, and will probably be heard from ere long.

PLUMAS.

TRAMWAY.—*Greenville Bulletin*, Oct. 6: The Green Mountain Co. are building a fine tramway from tunnel No. 5 to the new mill, a distance of a quarter of a mile. It will be so arranged that the loaded cars descending will draw the empty ones back to the tunnel.

NEW WANTED.—Quite a number of good miners could get work here now, and if any of our mining exchanges know of miners desiring work, please send them the way. A few carpenters could also find employment here at present.

DUMP HOUSE.—The Choreskes Co. has recently built one of the best dump houses in the mines. It is 35x40 ft, capacity, 800 tons of ore. There are 12 chutes leading to a wagon road in the middle, and the cars run from the tunnel without the loss of a wheel.

BIO PAY.—*Plumas National*, Oct. 9: Mr. J. H. Loring showed us some slugs the other day, which he got in his last week's work in the Loring & Leavitt claims, at Elizabethtown. They were big old-fashioned nuggets, weighing about \$30 each. Three hundred dollars were taken out from two sets of timbers. After 6 years of hard labor in getting this "hounza." It is a pleasure to chronicle their good luck. Since obtaining the nuggets, the men have some further rich developments in the shape of 25 ounces to "one pick," on Wednesday. They are certain they have got the "old Emigrant Hill lead," and there is no use in being surprised at anything they may get. And this is one of the "played out" Plumas mines.

ANOTHER STRIKE.—We are informed that another rich strike has been made in the tunnel claims owned by Alf Smith and the Cox, Davis estate, near Buttery, or rather at the head of Eliza's fork. Some time before Davis' death, Cox, Leo and Doc, Garrett leased his half of the mine, and they have been running tunnels ever since. Lately they have been making big wages, some reports say \$30 a day to the man. We are glad to hear of their good fortune, and hope that this boys will get "a hoot box full" before they lose the lead.

GOOD GRAVEL.—Mr. R. Z. Bell has lately been at work reaping and getting in order the Western gravel claims, near Newton. They have just got to work in the gravel, and for "a starter" took out \$23 to 2 picks on Wednesday. The Plumas gravel mines are "booming," sure enough.

ITEMS.—Two dollars and a half to the pan a day or two more in the big shift at Jamison, no more rock yet. That channel is known to be 14 miles long, and never has a pick stuck in the bottom of it. Every visitor to the Monte Christo mine brings additional evidence of its wonderful riches. Blue gravel and "lousy" with gold. The Black Hawk and Butt rily country is commencing to show up some big prospects.

SIERRA.

STEAM DRILL.—*Mountain Messenger*, Oct. 9: The Ruby company are preparing to put a steam drill at work in their tunnel at Cariboo ravine. Portions of the drill are lying at the Pileocene mine. The balance of the machinery is expected to arrive soon. The company are building a "tail" from Ruby Creek around into the ravine over which to take material.

BLACK JACK.—A winze has been sunk at the Black Jack and quartz found that pays \$24 to the ton, besides a large amount of sulphurets for which there is no way of working. When Supt. Welch returns from below, a tunnel will be started that will tap the ledge in about 100 ft.

The Bald Mountain extension tunnel will be in 2,000 ft by the middle of next week. The bedrock continues soft, and 3 ft of tunnel each three shifts of 24 hours is easily made.

EXCOBACINO.—Savage Co. are making rapid progress, better than ever before. They have struck plate rock on the left side of the face, which is considered a sure indication of a near approach to a rich gold channel.

PLUMBAGO.—Parties will be up this week to reorganize affairs concerning the Plumbago quartz ledge at Minnesota, and the prospect is work will be commenced soon again. It is deemed by Raymond & Earl, the San Francisco owners, to be a valuable property.

ACCIDENT.—An accident occurred in the Bald Mountain mine Sunday morning, by a carman running into the iron doors with a loaded car. These doors close the tunnel several hundred ft from its mouth. The night boys, thinking all the men had gone out, closed the doors, and when the carman reached the spot he saw that the doors were closed, but could not stop the heavy car on the grade in time to avoid a collision. Three sets of timbers were knocked down, but the man was not injured.

TRINITY.

BULLYHOOP.—*Trinity Journal*, Oct. 9: This quartz mining property is to be sold by M. F. Orin, Receiver, on Saturday.

NEW RIVER.—Assessor Marshall informs us that work is getting under way on the New River ditch, and they will soon have 75 white men and 50 Chinamen at work. The material, including a huge boiler, for a good saw-mill is on the ground.

NEVADA.

WASHOE DISTRICT.

The following statements made in regard to the leading mines are dated the 9th:

CALIFORNIA.—During the past week there have been extracted 1,143 tons of ore from the 1650 level, of the assay value of \$22.10 per ton. On the 2000 level the joint Ophir east crosscut are cutting out a chamber for a winze. On the 2500 level the joint Ophir east crosscut has been extended 11 ft, and the north drift has been advanced 17 ft. On the 2500 level the south drift from the Ophir lode has been advanced 18 ft. During the week \$23,117.15 in bullion have been shipped.

SIERRA NEVADA.—On the 2300 level the incline upraise to the 1700 level has been extended 18 ft; total length, 165 ft. On the 2400 level the repairs to station at east winze will be completed to-day. The pumps and air and water pipes on the old incline have all been removed and the engine used in the same is being taken up. On the 2500 level the west crosscut to the 2400 winze has been advanced 30 ft; total, 83 ft, leaving 15 ft to go.

COS. VIRGINIA.—During the past week 881 tons of ore have been extracted from the slopes on the 1700 level, of the assay value of \$21.40 per ton. On the 2000 level the joint Best & Belcher winze has been sunk 12 ft, and the north drift has been advanced 14 ft, and No. 1 raise has been extended 10 ft. During the past week bullion to the value of \$17,168.10 has been shipped.

ORISKANY.—On the 2000 level the joint California east crosscut is being chambered out for a winze. On the 2300 level the joint California upraise has been extended 11 ft. On the 2500 level the south drift has been extended 12 ft. In the 2300 level the south drift has been connected with the Mexican east crosscut. During the week 119 tons and 1,400 pounds of ore have been extracted from the 2000 level.

UNION CONSOLIDATED.—On the 2500 level the south drift from the Union shaft has been extended 30 ft. In the south drift from No. 1 winze are cutting down the grade. East crosscut No. 1 has been extended 24 ft, and crosscut No. 2 has been extended 25 ft. The upraise from the northeast drift has been extended 15 ft and the west drift hole has been extended 140 ft.

ALTA.—Since last report No. 1 crosscut has been advanced 48 ft; total length, 120 ft. The face is in soft porphyry, carrying streaks of quartz. No. 2 crosscut was advanced 47 ft; total length, 110 ft. The face is in a formation similar to that in crosscut No. 1. No water in either.

BENTON.—During the last week No. 1 crosscut was extended 45 ft; total length, 100 ft. We got through the hard rock mentioned in my last report, and now are in soft porphyry that works well. No sign of water in the face.

HALE AND NORCROSS.—On the 2400 level the south drift is being graded down. New guides are being placed in the south compartment of the vertical shaft. The mine is gradually cooling off.

MEXICAN.—On the 1000 level are resuming the north lead drift. On the 2500 level are cutting down the grade in the main north lateral drift.

C. AND C. SHARP.—The tank station at the 2400 level is being timbered up.

BRISTOL DISTRICT.

HILLSIDE.—*Pioche Record*, Oct. 6: Aulporant development is being made in the Hillside, where, on the 5th level east, the face of the drift upon crosscutting yesterday showed a breadth of nearly 30 ft of iron and spar, with between 6 and 3 ft of clear yellow carbonate, the extent of which cannot as yet be ascertained until the lagging and stulls are placed. The drift is now in nearly 500 ft, and the development looks more promising than anything heretofore in this mine for the past 3 months. From 7 to 10 tons of \$30 rock is being shipped to the Hillside furnaces from the Bay State, which is daily improving, showing a 4 ft vein of ore west of the shaft. A tunnel has been commenced for the better circulation of air. It is now in 20 ft, with small streaks of ore and hunches of copper in the face. The Hillside furnace is doing well, and the development outside of the mine, more bullion will be turned out during this run than for any previous run the past year.

TEMPER MINE.—Cliff Webster reports that work is being pushed on this mine. The main shaft has now attained a depth of 100 ft, and over 1,000 tons of ore is exposed to sight, ready to take out.

CHERRY CREEK DISTRICT.

STAR.—*Cor. White Pine News*, Oct. 7: The Star Co. is producing about the same amount of bullion as they have been doing for the past 3 months. The Exchange Co. has several hundred tons of first-class ore at their mill and are still hauling. Their mill is about ready to commence crushing, having to-day got up steam for the first time. The mill has been thoroughly overhauled and put in good repair, more stamps added, increasing its capacity, and in a few days more the exchange will again be a billion producing mine and make its mark upon the bullion tax assessment roll of old.

ESMERALDA DISTRICT.

AURORA COK.—*Esmeralda Herald*, Oct. 9: The tunnel is now in 135 ft, leaving about 30 ft to be accomplished to tap the ledge at a depth of 125 ft. The tunnel near the ledge is forming a good one favorable.

WORK RESUMED.—For some little time no work has been done on the Prospectus mine, for reasons only known to the parties interested. However, work was resumed on the Bladell tunnel, running for the main ledge, the first of the week, and is being pushed day and night. The outlook for this mine was never so good as at the present time.

REAL DEL MONTE.—Total depth of shaft is now 815 ft. Wednesday last, sinking in the shaft was suspended, and the drift on the 800 level started. The excavation for balance-hob on the 750 level was also commenced. As soon as these excavations are clear of the shaft sinking will be resumed and continued until the 1000 level is reached. The flow of water still keeps the pump running 7 strokes per minute.

SPLENDID ASSAYS.—Yesterday we were shown two certificates of assay made from rock taken from prominent mines in this district. The first was from a sample taken from a mine that has in sight to-day hundreds of thousands of tons of what is called here low-grade ore—from \$30 to \$40—and the assay showed close into the latter figure. The second was from a sample taken up in the hundreds, and was from a sample of ore taken from a mine that is well known and has plenty of the same rock. This latter mine will at no distant day play a most prominent part in the future of Esmeralda mining district.

EUREKA DISTRICT.

CALIFORNIA MINE.—*Eureka Sentinel*, Oct. 5: The Jackson mine is a good one and is owned by a rich, strong company, and still they are only working 8 men. There are many mines in this district, owned by Eureka business men, who employ more laborers and there is never a word said about their doings. For instance, Joe Mendes owns, or co-owns, the California mine, and he is showing the Ruby Dunderberg property, on Prospect mountain. We say "or co-owns," because one-half the property is bonded to Mr. A. S. Mandel, of New York, for \$25,000. From an employee of the mine, we learn that the main shaft is 136 ft deep; that they are at work upon two levels (the upper and lower), while one in the middle has ore, but the hoisting facilities are not sufficient to take out the ore. Only the three those worked. Twelve men were at work at this mine last week, and yesterday two more were sent up. The hoisting works consist of a whim, horse power, running buckets capable of hoisting from 500 to 1,000 lbs. In the upper level there is a body of ore 12 ft thick, and where work is being done on the lower one, the heaviest ore stands 15 ft high. The lower level was shown certificates of assay for 10th levels, and they run from \$50 to \$60 per ton. Upwards of 123 tons were shipped last August to the Richmond and Eureka furnaces, 23 tons now awaiting treatment at the latter and 30 at the former to-day, while the dumps are full.

ALBION.—*Sentinel*, Oct. 10: The Albion Co. are working 300 men in the mine. The Eureka tunnel is completed

a distance of 1,500 ft. Still in shale. Active mining operations are being carried on in the water level property. The California mine is shipping about 15 tons of ore to the Eureka Con. works daily. Assessment work has just been done on the Good Hope, adjoining the Lons Plac on the west. The Hope is looking well. Molino & Co., on the Mason City mine, are sinking a new shaft to the depth of 40 ft for the purpose of tapping the ore body.

I X L DISTRICT.

MILL.—*Silver State*, Oct. 5: Someone not long ago circulated the report among the newspapers of the State that this camp was a failure. We do not know who it was, and do not care to know him. There is no doubt but that I X L would be considerably further advanced if the work on the different locations had been expended on one or two instead of so many, but as it is, the mines are all looking good, and there seems to be no doubt among mining experts that the mines will ultimately prove among the best in the State. We now have every promise of the erection of a 10 stamp mill here within a short time, and there is sufficient ore in sight to justify the building of a mill of twice that capacity. There is no doubt that had the outside public taken the interest in this camp that is usually exhibited in new mining districts, we would have been crushing quartz and shipping bullion long ago. The men who have located and developed the place are worthy of every confidence, and deserving of every encouragement. They have pro-pected on limited means, and have worked and put their all in the mines, because they have unbought confidence in their permanence and worth.

PIOCHE DISTRICT.

BULLIONVILLE FURNACE.—*Pioche Record*, Oct. 6: W. J. Montgomery reports that every preparation is going on at Bullionville for the furnace and that in a short time work will be commenced. When once started it will take about 6 weeks to complete it. We hope to see it finished soon, as a number of our chloriders have ore on hand for shipment to whichever furnace does the best by them. The company is now erecting a stone building in Bullionville.

ARIZONA.

OLDS DISTRICT ITEMS.—*Silver Belt*, Oct. 6: Mr. Webster has struck the ledge in the Euclazette mine and crossed it. It is 20 ft from wall to wall, and carries ore of the same character as the recent strikes in the Mack Morris. It has gold in it. The Centennial Co. have purchased the new mill of the Euclazette Co. It can be put in order in a few days. The company are purchasing lumber and supplies, and commenced work last Friday. When in full operation they will employ 40 to 50 men. Knox & McNeilly have in their cabinet a nugget of weather-worn silver, weighing about 10 pounds. It was brought in a few days ago by M. Barron. They are timbering the main shaft on the Golden Eagle, and will have the hoisting works in operation in a few days. Stout, Bick & Co. have in their banking-room a piece of ore from the Mack Morris mine, weighing 75 pounds, which is remarkably rich. It is not a nugget, but a piece out of the body of the ledge. A rumor reaches us, too late to get particulars, that the old Skeleton mine, of which so much has been spoken, has been found, and is extremely rich in gold. It is said to be in the Sierra Anchas, or Broad Mountains. Things are going along smoothly at the Nugget. Judgeford from the pleased look which illuminates the faces of Mr. Chilson and the Superintendent, they must know something pleasant. Mr. P. T. Kelly is in from the Hatfield and Confidence mines. He brings us some rock, which is in the office and open to inspection. It carries gold and silver. The mines are located two miles from Skull Valley, on the Gila. W. H. Ford was in town Pioneer Saturday few days ago, and reports everything going along smoothly. The Great Republican mine is looking better than over. The shaft is 60 ft down and in good ore.

TIPTOP.—*Arizona Miner*, Oct. 8: The Tiptop mine continues to yield \$200-ore in large quantities, the mill to yield \$60,000 per month, and still we find the stock noted in San Francisco at \$5.

VALPARK.—Mr. Campbell returned home to-day from the Valparaiso mine, where he has been employed for some time assisting in the construction of the new 50-stamp mill of the Central Arizona mining company. The mill, in the opinion of Mr. Campbell, will be ready to drop stamps in about 60 days. Water, through the pipe from the Hassayampa had arrived at the mine. The company are prospecting the mine in a workmanlike manner.

DAY WASHING.—Valparaiso is doing good work in the placerias gold fields east of Walnut Grove. They work to a charm, and can be laid down here at a cost of about \$225.

CONCENTRATING.—*Arizona Sentinel*, Oct. 9: The Arizona Concentration Co. are now working 50 men, and are dry-washing from 50 to 100 tons of dirt daily. The dirt goes from \$2.50 to \$3.50 per ton. Their last clean-up of 33 tons averaged \$3.75 per ton, and one lot of 10 tons gave \$5 per ton. This company has an immense field for operation. They have machines for working 100 tons of dirt per day, and dirt enough to last for several years. They will soon have 100 machines at work, with a capacity of 8 tons to each machine.

TIPTOP.—*Phoenix Herald*, Oct. 8: The Tiptop Mining Co. has just made its shipment of bullion for the month of September. The bullion has been valued at \$14,400. As the mill did not run a full month, and is only a 10-stamp affair, their shipment speaks well for the quality of the ore.

COLORADO.

CAMP CLIFFORD.—*Register-Call*, Oct. 3: This mining camp, situated in York district, Clear Creek valley, was organized in the spring of 1879, and is proving up locations accessible by good wagon road routes. Considerable prospecting was done in an early day for gold-bearing quartz, but no veins were ever developed that yielded ore containing gold that would justify any person to work the veins with the methods then at hand for treating that class of pay. Three of the most prominent and recently discovered silver-bearing locations are the Jones, the Yellow Jacket, and the Yellow Jacket. The former has a shaft down to the depth of 22 ft and well cribbed up. The walls were fairly established when a break in the Consolidated ditch caused the mine to be filled with water. Since that time no deeper exploitation has been made, and it will not be until that enterprise has closed down for the winter. It is evident that the ditch will be permanently worked. Adjoining the Yellow Jacket are the Little Chief and the Yellow Eagle, which were discovered through crosscuts in the elide matter. The ore from the Yellow Jacket carries large quantities of native silver.

LINCOLN DISTRICT.—Above the mouth of the Hamilton gulch on the southerly slope of the mountain, many new veins in the spring of 1879 are proving up locations accessible by shafts or tunnels. Some of them show up well in mineral. A shaft has been sunk in the mouth of the Register-Call tunnel on the vein, and 4 inches of pay mineral has been uncovered. Crocker & Hume have discovered and are now opening up a discovery of silver-bearing ore in Upper Iowa district, on Fall River, which they have named the Lower Iowa district. The discovery is being made by working several lodges for capitalists living at Fall River and Idaho. Another season will witness a great rush to the mines along the slopes of the mountains on Fall River. A new era in mining is just beginning to dawn in this locality.

THE ROLLINS 10-STAMP MILL.—The 10-stamp mill of the Rollins gold and silver mining company, at Gold Dirt, which is being run by the management of Mr. George W. Barrett, is doing good work on the mill ores from the mines of that company. It was built for the purpose of testing the ores taken from several of the mines near Gold Dirt, and is proving highly successful for the experiments for which it was intended.

IDAHO.

CUSTER MILL.—*Yankee Fork Herald*, Oct. 6: Work is driving ahead on the Custer mill. It is expected that everything will be in running order by the 20th of November.

ORE.—Twenty tons of ore was knocked down at one blast on the Custer mine one day last week. Two pounds only of giant was required to do the work. From 60 to 70

tons of high-grade ore was displaced by 4 men in 10 hours. The rich streak of first-class ore in the Unknown has widened to 3 ft at the lowest workings. The Summit is showing up splendidly. Much of the quartz is studded with free gold.

THE SUGAR CRASS mines are looking better than ever. The ledges are large and full of good ore. Louis Bouvia struck a galena ledge 4 miles west of Bay Horse a few days ago. At a depth of 5 ft the vein made it 8 ft in width, and assays 110 ozs in silver.

THE BACINLOUT, 2 miles southeast of the Custer, is showing good ore, and has every promise of a true vein.

KAY & CO. are getting good pay on their placer ground at mouth of Jordan.

KINKINKIN.—Ore is coming into Clayton from the mines in the vicinity of Kinkinkin. The smelter will be ready to start in two or three weeks.

MONTANA.—A shipment of 13,500 pounds of second-class ore from the Montana was made on Wednesday last, per pack train, to the Bay Horse reduction works.

NUOORT.—A nugget weighing nearly 3 ozs was taken from Morrison's placer ground up Jordan one day this week. The lessees are making a good thing of it, and cau work the ground all winter.

DRAINED.—The tunnel on the Montezuma, next claim east of the Charles Dickens, has drained the shaft, and the work of taking out ore will begin in the course of a week or two.

THE CHARLES DICKENS arasta continues its large field of alluion. There are several thousand tons of pay-ore on the dumps, and more coming out every day.

HOISTING WORKS.—The new hoisting works on the Montana are nearly completed. The mine is now in perfect shape for the easy and rapid extraction of ore. A new opening is being made on the vein over 300 ft west of the present workings, showing a fine quality of quartz.

It has been well proven this year that Idaho has the richest quartz veins, and more of them, than any mineral country on the American continent.

CONSIDERABLE prospecting has been going on this summer in the Kinkinkin and Bay Horse sections, and some prospects have been struck.

MONTANA.

MILL DESTROYED AT DEWEY'S FLAT.—*Olemdale Atlantic*, Oct. 6: Last Wednesday night the quartz mill, owned by Gov. John A. Leggett, at Dewey's Flat, was entirely destroyed by fire. Supposed to have been the work of an incendiary. Only 5 steamships were mounted, but the capacity of the structure was 10 stamps.

ITEMS.—It is understood that an effort will be made to operate the 15-stamp mill of the Monroe Co., which has for some time been idle; and the Governor will at once proceed to erect a larger and better set of works on the ruins. The mines are showing much better than ever before, there being an abundance of ore in sight, and over 1,000 tons on the dump, which mill can do 100 ozs. There has been some 40 men at work, and it is to be hoped operations will soon resume, so as to make the detriment to the community as light as possible. Gov. Leggett's loss is reported to us at \$23,000, with insurance \$8,000. The mill was closed for the purpose of making a clean-up and, at the same time, repairing some portions of the machinery. It had done successful work for some time past.

UTAH.

BINGHAM NOTES.—*Salt Lake Tribune*, Oct. 6: Edwards struck a body of ore on the No. 2 East Yosemite and shipped 25 tons. Louis Martin is shipping ore every day from the First West extension of the Telegraph. The other mines along the line are being worked and the outlook is brighter. This week, with every reason to look for an improvement in condition of affairs throughout the old lead district. Hay M. J. Day is working 6 or 8 men on the Telegraph mine. The ground around the works is being graded off for a hoisting works and a boarding house. There are 12 men working on the Yosemite and extracting very good ore. The shaft has water in it yet and no attempts have been made to continue the work of sinking below the pyrites. The ore being shipped now is taken from the old vein, and some prospecting about the old lead vein.

SILVER REEF DISTRICT.—*Silver Reef Miner*, Oct. 2: The bullion shipments through Wells, Fargo & Co., for the month of September, aggregates the sum of \$97,712. The drifts both north and south in the Barbee & Walker mine maintain their fine appearance. The Stormont mine is making good shipments of fair grade ore. The new incline on the Leeds mine has now shafted a depth of 35 ft, and the ore is not only coming in in higher but improving in quality. From appearances, it will pay well for milling and extracting. The River Reef is attracting considerable attention, and the mines which are being worked never looked so well. The contractors working on the new Buckeye shaft were obliged to throw up the contract on account of the water. It is now being worked on day's wages.

CALIFORNIA.—*Salt Lake Tribune*, Oct. 10: Barnett & Hurd, a body of ore in the California mine, near the Poor Man, Ophir.

CUTTER.—The air in the Clipper mine, Bingham, is bad, and a lot of piping has been shipped to enable the miners to continue work on the body of 100-ounce silver ore struck there recently. There is great excitement in Frisco over the Carrie Lucille strike in Pine Oore district. The new machinery on the Jones Bonanza works is being worked. The air is beginning to strike the vein. Rich silver (milling) was struck yesterday in the lower tunnel of the Silver Crown mine, Black Jack, Bingham. A crosscut has been started on the 400 level of the Lady of the Lake; but the direction of the drift is kept secret.

PARK.—Business at the Park is booming right along. The Marsac mill will be ready to run by the 1st of the month. Work is progressing on both the railroads, the Empire mill is the new hoisting works for the Lowell mine. Next season will see it one of the liveliest camps in this West.

SIXTEEN men are employed grading and getting ready for the machinery at the Lowell & Williamson shaft, Park City. Work on the shaft commences next week. It will be a double compartment, 19 ft in diameter by 4 ft 4 inches. The plan is to sink 200 ft and then drift to the vein. Nick Treweek has the contract.

Two lots of Caledonia (Bingham) ore were sold to the Mingo Smelting Co. yesterday—one lot for \$177.50, and the other for \$24.50 per ton.

SILVER REEF ITEMS.—*Prospect*, Oct. 6: The interest in mining matters in this district is increasing daily, and certainly the outlook has never been more favorable than it is at the present time for a prosperous and busy season. Numerous properties that have been idle for the past year have either resumed operations or will do so soon. Chloriders and lessees are working in numerous instances with paying and gratifying results. In the Barbee & Walker mine prospecting is being prosecuted vigorously, and new discoveries are being made beyond a doubt that it will take several months to work the ore now in sight. Quite a number of changes have taken place since our last visit. New ore chutes have been placed at different points on the levels, and the old workings, which were at no time over safe, have been retimbered and filled with waste, so that now there is no danger of the ground giving way. The incline shaft on the Leeds mine has now shafted 45 ft. The vein continues to a considerable depth, and there is no doubt but such will be the case, the Leeds mill will be rattling away again before long. The new Buckeye shaft is being rapidly sunk, and will soon reach a depth of 150 ft. The water has not increased, and judging from the progress which is being made, and judging from the fact that the shaft is being sunk at the point at which the ore vein is expected to cut. The bullion shipment through Wells, Fargo & Co., from Silver Reef, from Oct. 1st to the 6th inclusive, aggregates \$29,974.63. The new air shaft on the Barbee & Walker mine, which has been sunk by contractors, was finished last Friday, when connection was made with the first level.

THE Evening Star Mining Co., of Leadville, Colorado, has declared a dividend of 50 cents per share, which has been payable at New York since the 5th instant.

Grasshoppers upon the Pacific Coast.

The visitations of locusts upon several different sections of the Pacific coast have brought much hardship and loss upon the agriculturists. It is true that the pests did not spread from the mountain valleys upon the great plains as it was feared they might, from the great abundance of them and the vigor of their egg-depositing last year. This threatened invasion was fortunately not realized, but there have been considerable numbers of the insects here and there in the San Joaquin and Sacramento valleys, and their presence has occasioned some damage and much alarm. This being the case we propose to give an illustrated chapter upon the destructive locusts, so that all readers may distinguish the different species, may understand their method of reproduction and recognize some of the parasites which do much in reducing their numbers. The basis of what we shall write is an article lately prepared for the *Evening Bulletin*, of this city by Prof. J. G. Lemmon, who is the thesaurus of locust learning on this coast, and for the most of the engravings which we introduce we are indebted to the courtesy of the *Bulletin* proprietors.

True locusts or grasshoppers, are insects of the straight-wing order (*Orthoptera*). They have a large head, short and stout feelers (an-

The "Leaser" (*Caloptenus atlantis*), Fig. 3, is much smaller than the others, of bright, contrasting gray and olive colors, and with a white line passing diagonally from the base of the wing down to the hind thigh.

The second genus, alluded to above, is the *cedipoda* or "big legs." This is a smaller genus of usually non-migratory and harmless locusts. But one species has, for some mysterious reason, become migratory in California to the extent of a few miles annually, and is then very destructive. This genus is without the curious spine under the neck, having a rounded Adam's apple instead, and the male abdomen is not enlarged, but tapers to a point. The principal species of the genus, the one with which we are concerned, is called the "Atrocious locust," (*Edipoda atroz*), Fig. 4.

The females are about an inch and a quarter long, of a light gray or a grayish-yellow color; the males a quarter shorter, and of a lighter yellowish or straw color. The males outnumber the females four or more to one, and are often mistaken for another species.

The "Atrocious locust" is found normally scattered all over the country, but this coast seems to be its headquarters or habitat, where the conditions favor its permanent residence and full development, and where, from Santa Barbara and Fresno to Sacramento and Shasta, loud complaints have often arisen of its swarming in immense numbers and eating the crops. The Atrocious locust (*Edipoda atroz*) is the grasshopper most frequently seen in the vicinity of the hay, and even on the streets of San

fruit trees, first devouring the leaves, then the fruit and twigs.

At Reno this season another large, green locust, over two inches long, is found following the had example of the *Caloptenus* family (to which his long neck-spine allies him) in defoliating the fruit shrubs and trees, being especially fond of roses and poplars. Also the Coral-wing grasshopper is seen trooping along with the gourmande, and the large, gray, long-winged, but harmless "Clapper locust" follows lazily after. Still another, the large, green-striped locust is too short-winged for flight at all, and wisely keeps to his eating of the umhellifer plants along the ditches, actually doing man a service by eating off the poison wild parsnip so fatal to his cattle.

The process of reproduction of the locust family is shown so well by the engravings that few words are necessary. Fig. 5, a, a, shows the female locust in different positions ovipositing; b, is the egg pod lifted out of its place in the ground and the end broken off to show the eggs; c, is a few eggs loose upon the ground; e and d, show sections of the hole in the ground, one being filled with eggs, the other being filled; f, shows an egg shell covered up. Fig. 7 shows different views of the egg mass somewhat enlarged.

Fig. 6 shows the character of the egg and the embryo as seen with the microscope. Below is the egg with its cell-like covering, which is magnified still more at one side; above is the inner shell and the young just before hatching. Fig. 8 shows in magnified form the anal char-

acteristics of the female and the organs which participate in ovipositing. The egg appears emerging from the body.

Parasites of the Locust.
One of the grandest laws in nature is that every animal, every plant, meets in time with check. Even the slowest breeding animal would soon overrun the country, were the counteracting influences by any means removed, while the more prolific species would do so in an incredible short space of time. Mother Nature, kind alike to all and cruel to all, advances her grand purposes, maintaining alive her myriads of species, each warring upon others and gaining temporary supremacy, accumulating only when in consequence of changed conditions, one species after another becomes too weak for its competitors, and is extinguished.

Something over 50 kinds of insects that prey upon the locust have been described, including wasps as large as itself, and little parasitic mites no larger than pin-heads, but which, by their great number, speedily suck the blood and soon kill their host.



DESTRUCTIVE LOCUSTS ON THE PACIFIC COAST, THEIR METHOD OF REPRODUCTION AND THE PARASITES WHICH PREY UPON THEM.

tenae), mouth furnished with strong sidewise moving jaws, and long, strong hind legs. The female abdomen terminates in four short horn-like organs arranged in pairs, one moving outward and upward, the other pair outward and downward when drilling holes in the earth for her eggs. The abdomen of the male rounds upward at the end like the prow of a boat.

Locusts are divided into many groups, comprising hundreds of genera and thousands of species differing from each other, chiefly by microscopic characters, but for the purposes of this article it is only necessary to distinguish the two genera concerned in the present California invasion.

The first genus to be considered is *Caloptenus*. The members of this large genus may be at once known by the presence of a curious spine or blunt thorn, like a yellow awl-point, which they bear under the neck, between the fore legs; also the males have the last abdominal segment greatly enlarged as well as upturned. There are 29 species in the United States, but three of which are found on the Pacific coast, the "Hated locust" (*C. spretus*), the "Red-leg" (*C. femurrubrum*), and the "Leaser" (*C. atlantis*). All of these are migratory, terribly destructive, and are known to have caused the great damage to the interior—and are suspected of aiding in the great invasion of 1838 and 1855, on the Pacific coast.

The "Hated locust" (*Caloptenus spretus*), Fig. 1, is usually one and one-quarter to one and one-half inches long, of a reddish brown color, with darker spots on body and wings. The long wings, on which it depends for its long flights of sometimes a thousand miles, extend a quarter of an inch beyond the body. The tip of the male abdomen is distinctly notched.

The "Red-leg" (*Caloptenus femurrubrum*), Fig. 2, is shorter, while of the same thickness, generally of a darker hue, while the apex of the male abdomen is truncate, as if cut squarely off.

Francisco, so he may be caught and studied by any one. Ordinarily it is harmless by its fewness in numbers, but at any season, favored by Mother Nature, it may become immensely numerous and destructive, as seen now in eastern Oregon, eastern and southern California.

Locust invasions, which occur suddenly by high-flying insects, which, when they alight, scramble about and devour every green thing, even to the bark of trees, must be some members of the long-winged, migrating *Caloptenus* family described, against which there is no remedy. The ancient Egyptian plague and the present Asiatic locusts, as also the destructive species of South America and Mexico, belong to the same great class of spine-bearers.

The Atrocious locust, which is usually few in numbers and non-migratory, has for three years past devastated Sierra valley, and last year sent colonies out to the south and west into Truckee Meadows and the valleys of Tahoe lake, Donner, and the high valleys about the railroad pass, and this year they are swarming more or less over the whole region.

What has often been noticed at the East is seen here too—all the locusts of the region go on the war-path together, at least, as far as the short wings of some of them will allow. It seems some favoring conditions of nature cause their rapid increase, and migrating and destructive eating are matters of necessity with them. So, here in all the afflicted region, locusts at some time of the year are found in vast numbers, and each devour his favorite food.

First, the "Atrocious" locust appears early in July, and attacks grain and grass on the high and dry localities, though he can, if pinched, relish rank growths of swamp grass and tule. Later comes the bright little "Leaser locust," attacking the heavier plants along the water courses and the garden vegetables. The "Red-leg" brigand lastly pounces upon the shrubs and

destructive in Sierra valley, is called the "large white grub," the larva of an insect whose full-grown form was unknown until this spring, but now known to be the larva of a "hover fly" (*Bombylius*), species not determined. The same larva has excited great interest in the interior by its effective onslaught upon the eggs of locusts. It is shown in enlarged form in Fig. 12. It seeks out a nest of eggs, eats the contents of the whole nest, 24 to 32 eggs, one by one, pushes the shells aside, while his own body, big and fat with the feast, fills the whole case, in which condition he curls up and enters upon his long winter's nap. The dormant stage lasts till spring, during which time the grub is about half an inch long and one-fifth thick, being largest in the middle and tapering slightly towards its head and tail. In this state several specimens at different times have been sent to Prof. Riley, at Washington, but he failed to perfect them in his vivarium. However, the question has been solved this spring in Sierra valley. Some earth, with an ascertained number of this larva therein, was carefully watched under glass. In July a beautiful little velvet-bodied fly, a species of *Bombylius*, appeared, having a long, black beak, with which it sucked nectar from flowers, to which it swiftly darted, then hovers above them like a hummingbird while sipping the nectar. To the services of this grub are the citizens of the north end of Sierra valley mainly indebted for untouched crops the present season, where for three years the locust has rioted, but where last fall its nests were soon emptied by this gourmand. The full-grown fly was frequently noticed in the fields about Franktown and around Reno, in August, and no doubt here, as elsewhere over the interior, this little fly is the avenging Nemesis to the locust.

The harvest throughout British Columbia has been abundant this season.

Plumas County Mining Interests.

From the *Greenville Bulletin*, a new journal started on the 29th ult. at Greenville, Plumas county, we take a resume of the mining interests of the county. The *Bulletin* starts in well by giving a good deal of local matter, and in its salutatory says: With the political contest we shall take no sides, preferring to devote our attention and energy to the advancement and upbuilding of this part of the country, and to a faithful record of its resources, capacities, possibilities and progress. Our motto will be, "Indian valley and Plumas county first, the world afterward."

The permanency and merit of the mines of the Greenville district are fully entitled to all the attention they are now receiving. The continued developments of the numerous quartz ledges now being worked are constantly attracting the attention of new capital, and the district, for gold quartz mining, promises to equal any in the State. The splendid and extensive developments of the Green Mountain mine places it among the best of the permanent producing mines of the State. The plant is extensive, and when the new 60-stamp mill, now fast approaching completion, is running, the crushing capacity, 92 stamps, will be the greatest of any mine in California. The new mill is first-class in its appointments. The cable tramway, now nearly completed, will be of capacity sufficient for all demands liable to be made on it.

The new Green Mountain mill will be ready to run in two weeks. The company have purchased the Cariboo water pipe, which they will lay across the slide on the Round Valley and Green Mountain ditch. The company have expended a large amount of money every winter repairing the ditch across the slide. The pipe will stop all further expense.

The Cherokee mine, adjoining the Green Mountain on the west, presents a very busy camp. The company have been pushing the reopening of this mine with vigor. A large amount of work has been done the past summer, and before winter the work will have so far progressed as to be unimpeded by storms.

The development on the Kettle mine shows some very rich ore. The croppings show remarkably rich ore, the ledge of which the company are now running for. The new hoisting works will have all the necessary improved machinery. The lower levels of this mine have produced very richly, and a large amount of bullion has been turned out by the old Kettle company. The development of the property is very promising. The company has just completed a fine 20-stamp water-mill.

The Plumas National mine has made some very valuable developments in their No. 3, or lower tunnel. The main pay chute of this mine is over 500 ft. in length in the No. 2 tunnel, with good ledge and pay still in the face, going west. This mine is rich in sulphurets. The company is now making extensive improvements in their mill, adding thereto seven Frue concentrators, to collect the sulphurets, and will shortly erect a furnace and chlorination works.

The No. 3 tunnel has struck the ledge within 60 ft. of the mouth of the tunnel, which from this point to No. 2 will give over 450 ft. of back on the incline of the ledge, and remarkable length on the vein. The supply of ore is years ahead of the present capacity to crush it. The Southern Eureka mine has been purchased by San Francisco and New York capital. The company have made a milling test of the ore, the results of which have been most satisfactory. A lower tunnel is being run, now in some 200 ft. They are now negotiating for a 10-stamp steam mill.

At the Gold Stripe mine a fine body of ore is being opened in the Goodwin part of the mine. The pay chute is over 140 ft. in length, and a shaft sunk on it 60 ft. There are 200 ft. of backs to this chute. The Lawrence ledge of same mine is opening out good ore. No. 3, Gold Stripe tunnel, is some 1,600 ft. in length, developing the whole mine. Two fine pay chutes of ore have been cut through. A new ledge has lately been opened, showing a fine body of quartz about 13 ft. wide, with perfect walls.

The Indian Valley mine, adjoining Greenville, gives promise of soon again being added to the list of producing mines in this district. This mine has always had the reputation of being one of the best in the county, but circumstances have prevented its being worked as its merits deserve. It has lately passed into the hands of some San Francisco gentlemen, who have been prosecuting developments that have opened out a new body of very fine grade ore, and the probabilities are the mine will be put in shape to be worked at an early date. The two mills will give a capacity of 56 stamps on this and the Union mine adjoining, part of the same property.

The Savercoo mine, near Prattville, has been sold to a syndicate representing Sacramento and New York capital, for \$35,000. The company have contracted for a 40-stamp mill, to be in running order in December. The mine gives promise of opening out big. It is rumored the Dutch Hill gravel mines are being negotiated for by some San Francisco mining men. A number of experts have been examining the property, and report well of it.

The Round Valley Reservoir Company will commence next week to clean out the entire length of their ditch. Over 2,000 ft. of 22-inch heavy iron pipe will be placed to conduct the water around the Indian Valley mine. The company will employ about 60 men, and hope to complete the work in a short time.

USEFUL INFORMATION.

PAPER BARRELS FOR OIL.—In view of the anticipated production of oil in this State, in quantities sufficient not only for home consumption but also for exportation, the following item may well be worth careful consideration: "An agent of the Standard Oil Company recently visited Hartford for the purpose of finding out whether it would be desirable to obtain of the American Paper Barrel Company of that city the enormous supply of barrels annually required by the former firm. The oil company cannot make its own wooden barrels so cheaply as it can purchase paper ones, which, if furnished at even half a cent less cost, would enable the company to save \$150 per day. The oil company own factories in Cleveland and Toledo which turn out daily 30,000 iron-bound and blue-painted wooden barrels at a cost of \$1.35 a barrel. Machines are used which put on the iron hoops at the rate of 1,200 a day, and each of these machines requires a man and two boys to attend it. Even the painting is done by machinery. If the oil company can be supplied with paper barrels at the rate of \$1.30 each, it can realize the great saving of \$9,000 a week. The American Paper Barrel Company, however, is not quite prepared to put their barrels on the market, but occasionally these barrels will undoubtedly supersede wooden ones for oil and for many other purposes."

NATURAL SPREAD OF THE APPLE TREE IN SOUTH AMERICA.—It is surprising how quickly the vegetation of many countries settled by Europeans has been modified. A writer in *Petermann's Mittheilungen* on the flora of Chile south of the Valdivia river, states that the scenery between the Rio Buena and its winding affluents reminds one very much of home. In the park-like prairies, associated with *Fagus obliqua*, a deciduous heech, are numerous scattered apple trees, originally introduced from Europe. The apple tree has spread from Valdivia to Osorno, and even crossed the Andes into northwestern Patagonia, and thence eastward. Indeed, it has become so widely spread and so general, that the Indians from the distant regions of the Argentine rivers, Rio Negro and Rio Colorado, are called manzaneros, or apple Indians. As a matter of fact, they and their kin in the provinces of Valdivia and Osorno live far more on the fruit of the apple tree than any European people, for it affords them both food and wine.

SPONTANEOUS IGNITION OF HYDROGEN.—Attention has recently been called to some peculiar cases of spontaneous ignition of hydrogen in air, the phenomenon having been noticed, it seems, in factories where quantities of zinc were being dissolved in hydrochloric acid for the preparation of zinc chloride. Violent explosions took place when no flame was near, and it was eventually ascertained that the gas took fire spontaneously. It is thought to be caused by fragments of very porous zinc, which, when lifted above the surface of the liquid, during the violent evolution of the gas, and so brought into contact with hydrogen and air, act just as spongy platinum would do under the circumstances. The performance of such operations in the open air is recommended. The ignition can be shown, according to M. Hoffman, by treating a few kilograms of finely divided zinc with acid; the zinc dust, he says, may even ignite by contact with water.

TO MAKE A STRONG PASTE.—To make a paste for fastening hills in a file hook, or for any purpose where a very strong paste is desired, the following recipe is recommended: Rice or starch paste is the best. Four parts, by weight, of fine glue are allowed to soften in 15 parts of cold water, and then moderately heated until the solution becomes quite clear; 65 parts of boiling water are now added with constant stirring. In another vessel 30 parts of starch paste are stirred up with 20 parts of cold water, so that a thin milky fluid is obtained without lumps. Into this the boiling glue solution is gradually stirred, and the whole kept at a boiling temperature for a short time. After cooling, a few drops of carbolie acid are added to the paste. This paste is exceedingly adhesive, and may be used for leather as well as for paper and cardboard. It should be preserved in corked bottles to prevent evaporation, and in this way will keep good for years.

CHEAP GAS.—Much attention has of late been directed to some new processes for producing a cheap gas by the decomposition of water, which, in the form of steam, is brought in contact with incandescent carbon. The reports made by the scientific press state that the experiments in this direction in Sweden and Russia have been attended with good results, and various scientific authorities, some of them government officials, declare that the gas has been employed for welding wrought iron, for smelting in crucibles, both pig iron and steel—the effect being very satisfactory in respect to the heating power of the gas. For illumination, this kind of gas is claimed to possess some peculiar advantages. When used for this latter purpose, the gas is conducted through a vessel filled with cotton moistened with benzine.

ADHESIVE FOR RUBBER BELTS.—A simple adhesive for rubber belts is made by sticking powdered chalk, which has been evenly sprinkled over, to the surface of the belt by cold tallow or boiled linseed oil.

A PRESERVATIVE wrapping paper, adapted for apples, oranges or other fruit, may be prepared by dipping a soft tissue paper in a bath of salicylic acid and bating it in the air to dry. The bath should consist of a strong alcoholic solution of salicylic acid diluted with all the water it will bear without precipitation. This preservative paper may be wrapped about the fruit before packing, and when the fruit arrives at its destination, the paper may be taken off and used for the same purpose again. A wrapping paper to protect furs, cloths, etc., from moth and mildew is prepared by dipping manila paper in a prepared bath, squeezing it and drying it over hot rollers. This bath consists of a mixture of 70 parts of the oil removed by the distillation of coal-tar naphtha, 5 parts of crude carbonic acid, containing at least 50% of phenola, 20 parts of thin coal tar at 160° Fahr., and 5 parts of refined petroleum.

TO PRESERVE WOODEN VESSELS.—Wooden vessels, which, especially in chemical works, are quickly destroyed, should, according to Herr Schaal be well dried in hot air, and then painted twice or thrice with a solution of paraffine in six parts of petroleum ether. Vessels in which boiling is effected with steam should further be coated with linseed-oil varnish, or with water-glass; after drying the water-glass coating should be removed by means of dilute muriatic acid. Paraffine is also well adapted for packing stuffing boxes, especially in stirring apparatus exposed to vapors of fuming and English sulphuric acid.

TO REMOVE SUNBURN AND FRECKLES.—A safe and refreshing cosmetic may be prepared for the removal of tan, sunburn and freckles. Procure at a druggist a pint bottle, exact measure, and put in one ounce of pure tincture of benzoin and fill the bottle with distilled water. This should have a fragrant, aromatic odor, and assume the color and consistency of milk. After applying with a little velvet sponge the mixture must be left to dry on, especially at night after a day's exposure to wind and sun. If the skin happens to be very sensitive and a slight burning sensation follows, more water may be added.

AMMONIA IN VEGETABLES.—H. Pellet has lately found appreciable quantities of ammonia in various kinds of grain, as well as in beet root. In wheat the weight of ammonia is one-tenth as great as that of the ashes. He thinks that ammonia and phosphoric acid enter into vegetables under the form of an ammoniacal magnesium phosphate, which is very soluble in all vegetable acids. He is now studying the effects of ammoniacal manures, and of nitrogen, under different forms, upon the amount of ammonia in vegetables.

GOOD HEALTH.

Popular Fallacies.

It is not true that sugar and candies are of themselves injurious to the teeth or the health of those who use them; so far from it, they are less injurious than any of the ordinary forms of food when employed in moderation.

Any scientific dentist will tell you that the parts of the teeth most liable to decay are those which afford lodgment to particles of food; such particles being decomposed by moisture and heat, give out an acid which will corrode steel as well as teeth; but pure sugar and pure candies are wholly dissolved, there is no remnant to be decomposed to yield this destructive acid; we remember now no item of food which is so perfectly dissolved in the mouth as sugar and candy. When visiting the sugar plantations of Cuba the attention was constantly arrested by the apparently white and solid teeth of the negroes who superintend the process of cane grinding; they drank the cane juice like water, there was no restraint as to its use, and the little urchins playing about would chew the sugar-yielding cane by the hour. It is much the same in Louisiana, where the shining faces and broad grins of the blacks are equally indicative of exuberant health and "splendid teeth."

How does it happen then that there should be "the prevalent belief" that sugar and sugar-candy destroy the teeth and undermine the health? Perhaps the most correct reply is *tradition*, the father of a progeny of errors in theory and practice; of errors in doctrine and example, "too tedious to mention."

One of the common faults of the times is an indisposition to investigate on the part of the masses. We take too much for granted. A very common answer to a demand for a reason for a time honored custom is, "Why, I have heard it all my life. Don't everybody say so?"

It would be a strange contradiction in the nature of things if sugar and candy in moderation should be hurtful to the human body in any way, for sugar is a constituent of every article of food we can name, there is not a vegetable out of which it cannot be made, not a ripe fruit in our orchards which does not yield it in large proportions, and it is the main constituent of that "milk" which is provided for the young of animals and men all over the world. Perhaps the child has never lived which did not love sweet things beyond all others; it is an instinct, a passion not less universal than the love of water. A very little child can be hired to do for a bit of sugar what nothing else would. The reason of this is, that without sugar no child could possibly live, it would freeze to death; it is the sugar in its food which keeps it warm, and warmth is the first necessity for a child.

But to use this information intelligently and profitably, it must be remembered that sugar is an artificial product, is a concentration, and that, if used in much larger proportions than would be found in our ordinary food, as provided by the beneficent Father of us all, we will suffer injury. We should never forget that the immoderate use of anything is destructive to human health and life if persevered in. The best general rules to be observed are two:

1st. Use concentrated sweets at meal times only. 2d. Use them occasionally and in moderation. — *Hall's Journal of Health.*

AURAL DISTURBANCES FROM BATHING.—The frequency of attacks of aural inflammation from bathing demands more than a mere mention, for complete deafness may result from the injuries to the ear from this cause, and partial impairment is frequent. These injuries from bathing are mainly due to the fact that man is not afforded the protection to the ear that amphibious animals possess, and hence the water may act injuriously in various ways. In surf bathing the mere force of contact, when the water flows into the ear, may injure the tympanic membrane, and when an incoming wave dashes against the face, water may freely enter the mouth or nose, and thus be driven into the ears through the eustachian tubes. The presence of cold water for a long time in the canal leading to the ear, as when much diving is done, may set up much inflammation in the canal or in the tympanic membrane, which may extend to the drum cavity itself. Ill effects may be produced by allowing the ears, head and body to dry in a current of air after coming out of the water. Sea water is probably more obnoxious than fresh, on account of its comparatively low temperature and the large quantity of salt it holds in solution. A long continuance in the water should be avoided. The Russian bath should not be taken without protecting the ears when the cold plunge is used. Diving is, however, the most dangerous practice connected with bathing, for it is difficult to keep water from entering the ears, or nose or mouth. In diving, the pressure of water on the tympanic membrane from without may cause vertigo. Even syringing the ears gently is known in some instances to occasion decided dizziness. — *Harpers Magazine.*

EATING FOR HEALTH.—One of the most prolific causes of disease is improper eating, or taking food when the stomach is not prepared to digest it. If food is taken at the proper time, and in not too great a quantity, and is composed of perfect cell structure, the stomach will faithfully perform its duties, and the process of assimilation will build up the system with healthy material. But if food fails to digest, the heat of the stomach soon rots it. A portion of this putrid matter is absorbed by the lacteals, taken up by the circulation, and deposited in various portions of the system to rebuild torn down tissue. Can such a condition of the human organism be an index to perfect health? Yet such states exist. People often eat, sometimes heartily—not because they are hungry, but because it is meal-time; and unwittingly violate a hygienic law which will result, if continued, in impaired health with all its concomitant evils. Many children are fed to death by kind, indulgent mothers—actually crammed with pastry, candy and nuts until their entire system is diseased, a mass of putrescence made from decayed vegetable and animal matter. We need not say anything of the evil effects of stimulants and excitants. The thousands of slaves to this form of dissipation, the dreary homes, ruined constitutions, and physical recks speak more forcibly than words of the baneful effects of unnatural stimulation. Drinking and eating, in short, cause more ills than any other two things in the world. And until people learn to govern their appetites these causes will breed disease and misery.

MORNING WALKS NOT HEALTHFUL.—It is a great mistake, says a medical writer, to suppose that a morning walk or other form of exercise before breakfast is healthful; the malaria which rests on the earth about sunrise in summer, when taken into the lungs and stomach, which are equally debilitated with other portions of the body from long fast since supper, is very readily absorbed and enters the circulation within an hour or two, poisoning the blood, and laying the foundation for troublesome diseases; while in winter the same debilitated condition of these vital organs readily allows the blood to be chilled and thus renders the system susceptible of taking cold, with all its varied and too often disastrous results. Some will say, look how healthy the farmer's boy is, and the daily laborers, who go to their work from one year's end to another by "crack of dawn!" My reply is, if they are healthy, they are so in spite of these exposures; their simple fare, their regular lives and their out-door industry, give their bodies a tone, a vigor, a capability of resisting disease, which nullifies the action of malaria to a very considerable extent.

ONE CAUSE OF INSANITY.—At a recent meeting of German doctors interested in the treatment of insane persons, a paper was read by the director of the Brunswick State Lunatic Asylum, in which he maintained that much of the increase of insanity in Germany is attributable to the excessive amount of work imposed upon the pupils in the national schools.

Grasshoppers upon the Pacific Coast.

The visitations of locusts upon several different sections of the Pacific coast have brought much hardship and loss upon the agriculturists. It is true that the pests did not spread from the mountain valleys upon the great plains as it was feared they might, from the great abundance of them and the vigor of their egg-disposing last year. This threatened invasion was fortunately not realized, but there have been considerable numbers of the insects here and there in the San Joaquin and Sacramento valleys, and their presence has occasioned some damage and much alarm. This being the case we propose to give an illustrated chapter upon the destructive locusts, so that all readers may distinguish the different species, may understand their method of reproduction and recognize some of the parasites which do much in reducing their numbers. The basis of what we shall write is an article lately prepared for the *Evening Bulletin*, of this city by Prof. J. G. Lammon, who is the thesaurus of locust learning on this coast, and for the most of the engravings which we introduce we are indebted to the courtesy of the *Bulletin* proprietors.

True locusts or grasshoppers, are insects of the straight-wing order (*Orthoptera*). They have a large head, short and stout feelers (an-

tenae), month furnished with strong sidewise moving jaws, and long, strong hind legs. The female abdomen terminates in four short horn-like organs arranged in pairs, one moving outward and upward, the other pair outward and downward when drilling holes in the earth for her eggs. The abdomen of the male rounds upward at the end like the prow of a boat.

Locusts are divided into many groups, comprising hundreds of genera and thousands of species differing from each other, chiefly by microscopic characters, but for the purposes of this article it is only necessary to distinguish the two genera concerned in the present California invasion.

The first genus to be considered is *Caloptenus*. The members of this large genus may be at once known by the presence of a curious spine or blunt thorn, like a yellow awl-point, which they bear under the neck, between the fore legs; also the males have the last abdominal segment greatly enlarged as well as upturned. There are 29 species in the United States, but three of which are found on the Pacific coast, the "Hated locust" (*C. spretus*), the "Red-leg" (*C. femur-rubrum*), and the "Lesser" (*C. atlantis*). All of these are migratory, terribly destructive, and are known to have caused the great damage to the interior—and are suspected of aiding in the great invasion of 1838 and 1855, on the Pacific coast.

The "Hated locust" (*Caloptenus spretus*), Fig. 1, is usually one and one-quarter to one and one-half inches long, of a reddish brown color, with darker spots on body and wings. The long wings, on which it depends for its long flights of sometimes a thousand miles, extend a quarter of an inch beyond the body. The tip of the male abdomen is distinctly notched.

The "Red-leg" (*Caloptenus femur-rubrum*), Fig. 2, is shorter, while of the same thickness, generally of a darker hue, while the apex of the male abdomen is truncate, as if cut squarely off.

The second genus, alluded to above, is the *adipoda* or "big legs." This is a smaller genus of usually non-migratory and harmless locusts. But one species has, for some mysterious reason, become migratory in California to the extent of a few miles annually, and is then very destructive. This genus is without the curious spine under the neck, having a rounded Adam's apple instead, and the male abdomen is not enlarged, but tapers to a point. This principal species of the genus, the one with which we are concerned, is called the "Atrocious locust," (*Edipoda atrox*), Fig. 4.

The females are about an inch and a quarter long, of a light gray or a grayish-yellow color; the males a quarter shorter, and of a lighter yellowish or straw color. The males outnumber the females four or more to one, and are often mistaken for another species.

The "Atrocious locust" is found normally scattered all over the country, but this coast seems to be its headquarters or habitat, where the conditions favor its permanent residence and full development, and where, from Santa Barbara and Fresno to Sacramento and Shasta, loud complaints have often arisen of its swarming in immense numbers and eating the crops. The Atrocious locust (*Edipoda atrox*) is the grasshopper most frequently seen in the vicinity of the bay, and even on the streets of San

fruit trees, first devouring the leaves, then the fruit and twigs.

At Reno this season another large, green locust, over two inches long, is found following the bad example of the *Caloptenus* family (to which his long neck-spine alludes him) in defoliating the fruit shrubs and trees, being especially fond of roses and poplars. Also the Coral-wing grasshopper is seen trooping along with the gourmands, and the large, gray, long-winged, but harmless "Clapper locust" follows lazily after. Still another, the large, green-striped locust is too short-winged for flight at all, and wisely keeps to his eating of the umbellifer plants along the ditches, actually doing man a service by eating off the poison wild parsnip so fatal to his cattle.

The process of reproduction of the locust family is shown so well by the engravings that few words are necessary. Fig. 5, a, a, a, shows the female locust in different positions ovipositing; b, is the egg pod lifted out of its place in the ground and the end broken off to show the eggs; c, is a few eggs loose upon the ground; d, shows sections of the hole in the ground, one being filled with eggs, the other being filled; f, shows an egg shell covered up. Fig. 7 shows different views of the egg mass somewhat enlarged.

Fig. 6 shows the character of the egg and the embryo as seen with the microscope. Below is the egg with its cell-like covering, which is magnified still more at one side; above is the inner shell and the young just before hatching. Fig. 8 shows in magnified form the anal char-

acteristics of the female and the organs which participate in ovipositing. The egg appears emerging from the body.

Parasites of the Locust. One of the grandest laws in nature is that every animal, every plant, meets in time with check. Even the slowest breeding animal would soon overrun the country, were the counteracting influences by any means removed, while the more prolific species would do so in an incredible short space of time. Mother Nature, kind alike to all and cruel to all, advances her grand purposes, maintaining alive her myriads of species, each warring upon others and gaining temporary supremacy, succumbing only when in consequence of changed conditions, one species after another becomes to weak for its competitors, and is exterminated.

Something over 50 kinds of insects that prey upon the locust have been described, including wasps as large as itself, and little parasitic mites no larger than pin-heads, but which, by their great number, speedily suck the blood and soon kill their host.



Fig. 2.



Fig. 3.



Fig. 4.

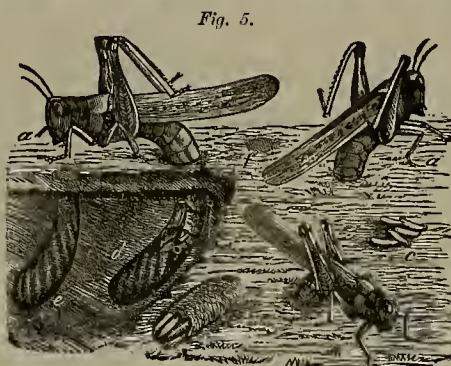


Fig. 5.

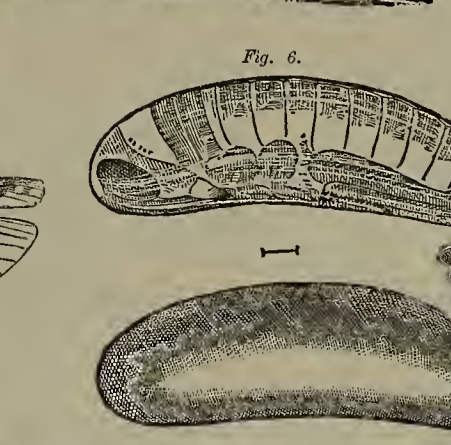


Fig. 6.

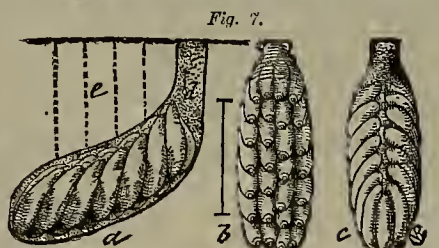


Fig. 7.



Fig. 8.



Fig. 9.

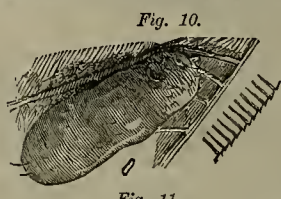


Fig. 10.

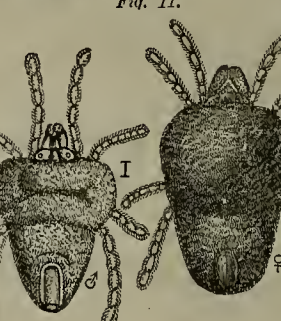


Fig. 11.

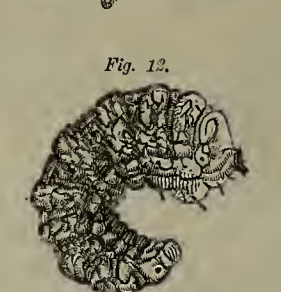


Fig. 12.

DESTRUCTIVE LOCUSTS ON THE PACIFIC COAST, THEIR METHOD OF REPRODUCTION AND THE PARASITES WHICH PREY UPON THEM.

Francisco, so he may be caught and studied by any one. Ordinarily it is harmless by its fewness in numbers, but at any season, favored by Mother Nature, it may become immensely numerous and destructive, as seen now in eastern Oregon, eastern and southern California.

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The Atrocious locust, which is usually few in numbers and non-migratory, has for three years past devastated Sierra valley, and last year sent colonies out to the south and west into Truckee Meadows and the valleys of Taboe lake, Donner, and the high valleys about the railroad pass, and this year they are swarming more or less over the whole region.

What has often been noticed at the East is seen here too—all the locusts of the region go on the war-path together, at least, as far as the short wings of some of them will allow. It seems some favoring conditions of nature cause their rapid increase, and migrating and destructive eating are matters of necessity with them. So, here in all the afflicted region, locusts at some time of the year are found in vast numbers, and each devours his favorite food.

First, the "Atrocious" locust appears early in July, and attacks grain and grass on the high and dry localities, though he can, if pinched, relish rank growths of swamp grass and tule. Later comes the bright little "Lesser locust," attacking the heavier plants along the water courses and the garden vegetables. The "Red-leg" brigand lastly pounces upon the shrubs and

structure in Sierra valley, is called the "large white grub," the larva of an insect whose full-grown form was unknown until this spring, but now known to be the larva of a "hover fly" (*Bombus*), species not determined. The same larva has excited great interest in the interior by its effective onslaught upon the eggs of locusts. It is shown in enlarged form in Fig. 12. It seeks out a nest of eggs, eats the contents of the whole nest, 24 to 32 eggs, one by one, pushes the shells aside, while his own body, big and fat with the feast, fills the whole case, in which condition he curls up and enters upon his long winter's nap. The dormant stage lasts till spring, during which time the grub is about half an inch long and one-fifth thick, being largest in the middle and tapering slightly towards its head and tail. In this state several specimens at different times have been sent to Prof. Riley, at Washington, but he failed to perfect them in his vivarium. However, the question has been solved this spring in Sierra valley. Some earth, with an ascertained number of this larva therein, was carefully watched under glass. In July a beautiful little velvet-bodied fly, a species of *Bombus*, appeared, having a long, black beak, with which it sucks nectar from flowers, to which it swiftly darts, then hovers above them like a humming-bird while sipping the nectar. To the services of this grub are the citizens of the north end of Sierra valley mainly indebted for untouched crops the present season, where for three years the locust has rioted, but where last fall its nests were soon emptied by this gourmand. The full-grown fly was frequently noticed in the fields about Franktown and around Reno, in August, and no doubt here, as elsewhere over the interior, this little fly is the avenging Nemesis to the locust.

The harvest throughout British Columbia has been abundant this season.

Plumas County Mining Interests.

From the *Greenville Bulletin*, a new journal started on the 29th ult. at Greenville, Plumas county, we take a resume of the mining interests of the county. The *Bulletin* starts in well by giving a good deal of local matter, and in its salutary says: With the political contest we shall take no sides, preferring to devote our attention and energy to the advancement and upbuilding of this part of the country, and to a faithful record of its resources, capacities, possibilities and progress. Our motto will be, "Indiana valley and Plumas county first, the world afterward."

The permanency and merit of the mines of the Greenville district are fully entitled to all the attention they are now receiving. The continued developments of the numerous quartz ledges now being worked are constantly attracting the attention of new capital, and the district, for gold quartz mining, promises to equal any in the State. The splendid and extensive developments of the Green Mountain mine places it among the best of the permanent producing mines of the State. The plant is extensive, and when the new 60 stamp mill, now fast approaching completion, is running, the crushing capacity, 92 stamps, will be the greatest of any mine in California. The new mill is first-class in its appointments. The cable tramway, now nearly completed, will be of capacity sufficient for all demands liable to be made on it.

The new Green Mountain mill will be ready to run in two weeks. The company have purchased the Cariboo water pipe, which they will lay across the slide on the Round Valley and Green Mountain ditch. The company have expended a large amount of money every winter repairing the ditch across the slide. The pipe will stop all further expense.

The Cherokee mine, adjoining the Green Mountain on the west, presents a very busy camp. The company have been pushing the reopening of this mine with vigor. A large amount of work has been done the past summer, and before winter the work will have so far progressed as to be unimpeded by storms.

The development on the Kettle mine shows some very rich ore. The croppings show remarkably rich ore, the ledge of which the company are now running for. The new hoisting works will have all the necessary improved machinery. The lower levels of this mine have produced very richly, and a large amount of bullion has been turned out by the old Kettle company. The development of the property is very promising. The company has just completed a fine 20-stamp water-mill.

The Plumas National mine has made some very valuable developments in their No. 3, or lower tunnel. The main pay chute of this mine is over 500 ft. in length in the No. 2 tunnel, with good ledge and pay still in the face, going west. This mine is rich in sulphurets. The company is now making extensive improvements in their mill, adding thereto seven Frue concentrators, to collect the sulphurets, and will shortly erect a furnace and chlorination works.

The No. 3 tunnel has struck the ledge within 60 ft. of the mouth of the tunnel, which from this point to No. 2 will give over 450 ft. of back on the incline of the ledge, and remarkable leach on the vein. The supply of ore is years ahead of the present capacity to crush it. The Southern Eureka mine has been purchased by San Francisco and New York capital. The company have made a milling test of the ore, the results of which have been most satisfactory. A lower tunnel is being run, now in some 200 ft. They are now negotiating for a 10-stamp steam mill.

At the Gold Stripe mine a fine body of ore is being opened in the Goodwin part of the mine. The pay chute is over 140 ft. in length, and a shaft sunk on it 60 ft. There are 200 ft. of back to this chute. The Lawrence ledge of same mine is opening out good ore. No. 3, Gold Stripe tunnel, is some 1,600 ft. in length, developing the whole mine. Two fine pay chutes of ore have been cut through. A new ledge has lately been opened, showing a fine body of quartz about 13 ft. wide, with perfect walls.

The Indian Valley mine, adjoining Greenville, gives promise of soon again being added to the list of producing mines in this district. This mine has always had the reputation of being one of the best in the county, but circumstances have prevented its being worked as its merits deserve. It has lately passed into the hands of some San Francisco gentlemen, who have been prosecuting developments that have opened out a new body of very fine grade ore, and the probabilities are the mine will be put in shape to be worked at an early date. The two mills will give a capacity of 56 stamps on this and the Union mine adjoining, part of the same property.

The Savercool mine, near Prattville, has been sold to a syndicate representing Sacramento and New York capital, for \$35,000. The company have contracted for a 40-stamp mill, to be in running order in December. The mine gives promise of opening out big. It is rumored the Dutch Hill gravel mines are being negotiated for by some San Francisco mining men. A number of experts have been examining the property, and report well of it.

The Round Valley Reservoir Company will commence next week to clean out the entire length of their ditch. Over 2,000 ft. of 22-inch heavy iron pipe will be placed to conduct the water around the Indian Valley mine. The company will employ about 60 men, and hope to complete the work in a short time.

USEFUL INFORMATION.

PAPER BARRELS FOR OIL.—In view of the anticipated production of oil in this State, in quantities sufficient not only for home consumption but also for exportation, the following item may well be worth careful consideration: "An agent of the Standard Oil Company recently visited Hartford for the purpose of finding out whether it would be desirable to obtain of the American Paper Barrel Company of that city the enormous supply of barrels annually required by the former firm. The oil company cannot make its own wooden barrels so cheaply as it can purchase paper ones, which, if furnished at even half a cent less cost, would enable the company to save \$150 per day. The oil company own factories in Cleveland and Toledo which turn out daily 30,000 iron-bound and blue-painted wooden barrels at a cost of \$1.35 a barrel. Machines are used which put on the iron hoops at the rate of 1,200 a day, and each of these machines requires a man and two boys to attend it. Even the painting is done by machinery. If the oil company can be supplied with paper barrels at the rate of \$1.30 each, it can realize the great saving of \$9,000 a week. The American Paper Barrel Company, however, is not quite prepared to put their barrels on the market, but eventually these barrels will undoubtedly supersede wooden ones for oil and for many other purposes."

NATURAL SPREAD OF THE APPLE TREE IN SOUTH AMERICA.—It is surprising how quickly the vegetation of many countries settled by Europeans has been modified. A writer in *Petermann's Mittheilungen* on the flora of Chile south of the Valdivia river, states that the scenery between the Rio Buea and its winding alluvial remiads one very much of home. In the park-like prairies, associated with *Fagus obliqua*, *n. deciduous* hesh, are numerous scattered apple trees, originally introduced from Europe. The apple tree has spread from Valdivia to Osorno, and even crossed the Andes into northwestern Patagonia, and thence eastward. Indeed, it has become so widely spread and so general, that the Indians from the distant regions of the Argentine rivers, Rio Negro and Rio Colorado, are called *manzaneros*, or apple Indians. As a matter of fact, they and their kin in the provinces of Valdivia and Osorno live far more on the fruit of the apple tree than any European people, for it affords them both food and wine.

SPONTANEOUS IGNITION OF HYDROGEN.—Attention has recently been called to some peculiar cases of spontaneous ignition of hydrogen in air, the phenomenon having been noticed, it seems, in factories where quantities of zinc were being dissolved in hydrochloric acid for the preparation of zinc chloride. Violent explosions took place when no flame was near, and it was eventually ascertained that the gas took fire spontaneously. It is thought to be caused by fragments of very porous zinc, which, when lifted above the surface of the liquid, during the violent evolution of the gas, and so brought into contact with hydrogen and air, act just as spongy platinum would do under the circumstances. The performance of such operations in the open air is recommended. The ignition can be shown, according to M. Hoffman, by treating a few kilograms of finely divided zinc with acid; the zinc dust, he says, may even ignite by contact with water.

TO MAKE A STRONG PASTE.—To make a paste for fastening hills in a file hook, or for any purpose where a very strong paste is desired, the following recipe is recommended: Rice or starch paste is the best. Four parts, by weight, of fine glue are allowed to soften in 15 parts of cold water, and then moderately heated until the solution becomes quite clear; 65 parts of boiling water are now added with constant stirring. In another vessel 30 parts of starch paste are stirred up with 20 parts of cold water, so that a thin milky fluid is obtained without lumps. Into this the boiling glue solution is gradually stirred, and the whole kept at a boiling temperature for a short time. After cooling, a few drops of carboic acid are added to the paste. This paste is exceedingly adhesive, and may be used for leather as well as for paper and cardboard. It should be preserved in corked bottles to prevent evaporation, and in this way will keep good for years.

CHEAP GAS.—Much attention has of late been directed to some new processes for producing a cheap gas by the decomposition of water, which, in the form of steam, is brought in contact with incandescent carbon. The reports made by the scientific press state that the experiments in this direction in Sweden and Russia have been attended with good results, and various scientific authorities, some of them government officials, declare that the gas has been employed for welding wrought iron, for smelting in crucibles, both pig iron and steel—the effect being very satisfactory in respect to the heating power of the gas. For illumination, this kind of gas is claimed to possess some peculiar advantages. When used for this latter purpose, the gas is conducted through a vessel filled with cotton moistened with benzene.

ADHESIVE FOR RUBBER BELTS.—A simple adhesive for rubber belts is made by sticking powdered chalk, which has been evenly sprinkled over, to the surface of the belt by cold tallow or boiled linseed oil.

A PRESERVATIVE wrapping paper, adapted for apples, oranges or other fruit, may be prepared by dipping a soft tissue paper in a bath of salicylic acid and hanging it in the air to dry. The bath should consist of a strong alcoholic solution of salicylic acid diluted with all the water it will bear without precipitation. This preservative paper may be wrapped about the fruit before packing, and when the fruit arrives at its destination, the paper may be taken off and used for the same purpose again. A wrapping paper to protect furs, cloths, etc., from moth and mildew is prepared by dipping Manila paper in a prepared bath, squeezing it and drying it over hot rollers. This bath consists of a mixture of 70 parts of the oil removed by the distillation of coal-tar naphtha, 5 parts of crude carbolic acid, containing at least 50% of phenols, 20 parts of thin coal tar at 160° Fahr., and 5 parts of refined petroleum.

TO PRESERVE WOODEN VESSELS.—Wooden vessels, which, especially in chemical works, are quickly destroyed, should, according to Herr Schaal be well dried in hot air, and then painted twice or thrice with a solution of paraffine in six parts of petroleum ether. Vessels in which boiling is effected with steam should further be coated with linseed-oil varnish, or with water-glass; after drying the water-glass coating should be removed by means of dilute muriatic acid. Paraffine is also well adapted for packing stuffing boxes, especially in stirring apparatus exposed to vapors of fuming and English sulphuric acid.

TO REMOVE SUNBURN AND FRECKLES.—A safe and refreshing cosmetic may be prepared for the removal of tan, sunburn and freckles. Procure at a druggist a pint bottle, exact measure, and put in one ounce of pure tincture of benzoin and fill the bottle with distilled water. This should have a fragrant, aromatic odor, and assume the color and consistency of milk. After applying with a little velvet sponge the mixture must be left to dry on, especially at night after a day's exposure to wind and sun. If the skin happens to be very sensitive and a slight burning sensation follows, more water may be added.

AMMONIA IN VEGETABLES.—H. Pellet has lately found appreciable quantities of ammonia in various kinds of grain, as well as in beet root. In wheat the weight of ammonia is one-tenth as great as that of the ashes. He thinks that magnesia and phosphoric acid enter into vegetables under the form of an ammoniacal magnesium phosphate, which is very soluble in all vegetable acids. He is now studying the effects of ammoniacal manures, and of nitrogen, under different forms, upon the amount of ammonia in vegetables.

GOOD HEALTH.

Popular Fallacies.

It is not true that sugar and candies are of themselves injurious to the teeth or the health of those who use them; so far from it, they are less injurious than any of the ordinary forms of food when employed in moderation.

Any scientific dentist will tell you that the parts of the teeth most liable to decay are those which afford lodgment to particles of food; such particles being decomposed by moisture and heat, give out an acid which will corrode steel as well as teeth; but pure sugar and pure candies are wholly dissolved, there is no remnant to be decomposed to yield this destructive acid; we remember now no item of food which is so perfectly dissolved in the mouth as sugar and candy. When visiting the sugar plantations of Cuba the attention was constantly arrested by the apparently white and solid teeth of the negroes who superintend the process of cane grinding; they drank the cane juice like water, there was no restraint as to its use, and the little urchins playing about would chew the sugar-yielding cane by the hour. It is much the same in Louisiana, where the shining faces and broad grins of the blacks are equally indicative of exuberant health and "splendid teeth."

How does it happen then that there should be "the prevalent belief" that sugar and sugar-candy destroy the teeth and undermine the health? Perhaps the most correct reply is *tradition*, the father of a progeny of errors in theory and practice; of errors in doctrine and example, "too tedious to mention."

One of the common faults of the times is an indisposition to investigate on the part of the masses. We take too much for granted. A very common answer to a demand for a reason for a time honored custom is, "Why, I have heard it all my life. Don't everybody say so?"

It would be a strange contradiction in the nature of things if sugar and candy in moderation should be hurtful to the human body in any way, for sugar is a constituent of every article of food we can name, there is not a vegetable out of which it cannot be made, not a ripe fruit in our orchards which does not yield it in large proportions, and it is the main constituent of that "milk" which is provided for the young of animals and men all over the world. Perhaps the child has never lived which did not love sweet things beyond all others; it is an instinct, a passion not less universal than the love of water. A very little child can be hired to do for a hit of sugar what nothing else would. The reason of this is, that without sugar no child

could possibly live, it would freeze to death; it is the sugar in its food which keeps it warm, and warmth is the first necessity for a child.

But to use this information intelligently and profitably, it must be remembered that sugar is an artificial product, is a concentration, and that, if used in much larger proportions than would be found in our ordinary food, as provided by the beneficent Father of us all, we will suffer injury. We should never forget that the immoderate use of anything is destructive to human health and life if persevered in. The best general rules to be observed are two:

1st. Use concentrated sweets at meal times only. 2d. Use them occasionally and in moderation.—*Hall's Journal of Health.*

AURAL DISTURBANCES FROM BATHING.—The frequency of attacks of aural inflammation from bathing demands more than a mere mention, for complete deafness may result from the injuries to the ear from this cause, and partial impairment is frequent. These injuries from bathing are mainly due to the fact that man is not afforded the protection to the ear that amphibious animals possess, and hence the water may act injuriously in various ways. In surf bathing the mere force of contact, when the water flows into the ear, may injure the tympanic membrane, and when an incoming wave dashes against the face, water may freely enter the mouth or nose, and thus be driven into the ears through the eustachian tubes. The presence of cold water for a long time in the canal leading to the ear, as when much diving is done, may set up much inflammation in the canal or in the tympanic membrane, which may extend to the drum cavity itself. If effects may be produced by allowing the ears, head and body to dry in a current of air after coming out of the water. Sea water is probably more obnoxious than fresh, on account of its comparatively low temperature and the large quantity of salt it holds in solution. A long continuance in the water should be avoided. The Russian bath should not be taken without protecting the ears when the cold plunge is used. Diving is, however, the most dangerous practice connected with bathing, for it is difficult to keep water from entering the ears, or nose or mouth. In diving, the pressure of water on the tympanic membrane from without may cause vertigo. Even syringing the ears gently is known in some instances to occasion decided dizziness.—*Harper's Magazine.*

EATING FOR HEALTH.—One of the most prolific causes of disease is improper eating, or taking food when the stomach is not prepared to digest it. If food is taken at the proper time, and in not too great a quantity, and is composed of perfect cell structure, the stomach will faithfully perform its duties, and the process of assimilation will build up the system with healthy material. But if food fails to digest, the heat of the stomach soon rots it. A portion of this putrid matter is absorbed by the lacteals, taken up by the circulation, and deposited in various portions of the system to rebuild torn down tissue. Can such a condition of the human organism be an index to perfect health? Yet such states exist. People often eat, sometimes heartily—not because they are hungry, but because it is meal-time; and unwittingly violate a hygienic law which will result, if continued, in impaired health with all its concomitant evils. Many children are fed to death by kind, indulgent mothers—actually crammed with pastry, candy and nuts until their entire system is diseased, a mass of putrescence made from decayed vegetable and animal matter. We need not say anything of the evil effects of stimulants and excitants. The thousands of slaves to this form of dissipation, the dreary homes, ruined constitutions, and physical racks speak more forcibly than words of the baneful effects of unnatural stimulation. Drinking and eating, in short, cause more ills than any other two things in the world. And until people learn to govern their appetites these causes will breed disease and misery.

MORNING WALKS NOT HEALTHFUL.—It is a great mistake, says a medical writer, to suppose that a morning walk or other form of exercise before breakfast is healthful; the malaria which rests on the earth about sunrise in summer, when taken into the lungs and stomach, which are equally debilitated with other portions of the body from long fast since supper, is very readily absorbed and enters the circulation within an hour or two, poisoning the blood, and laying the foundation for troublesome diseases; while in winter the same debilitated condition of these vital organs readily allows the blood to be chilled and thus renders the system susceptible of taking cold, with all its varied and too often disastrous results. Some will say, look how healthy the farmer's boy is, and the daily laborers, who go to their work from one year's end to another by "crack of dawn!" My reply is, if they are healthy, they are so in spite of these exposures; their simple fare, their regular lives and their out-door industry, give their bodies a tone, a vigor, a capability of resisting disease, which nullifies the action of malaria to a very considerable extent.

ONE CAUSE OF INSANITY.—At a recent meeting of German doctors interested in the treatment of insane persons, a paper was read by the director of the Brunswick State Lunatic Asylum, in which he maintained that much of the increase of insanity in Germany is attributable to the excessive amount of work imposed upon the pupils in the national schools.



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The Week.

The excitement of the political campaign increase as the day of election draws near, and even the somewhat exclusive pursuit of money making is for the time overlooked. Many of our exchanges team with political news and opinions to the exclusion of local topics. From the mining districts generally, however, the news is good. Preparations are now being made for winter in most of the camps. Ditches are being repaired, machinery overhauled, wood laid in, and arrangements made to save trouble during the winter months.

In these regions the week has been characterized by beautiful weather, clear, sunny days and fine, cool nights. Although in daily expectation of rain, there are no indications of it at present writing. The hydraulic miners are all prepared for the rain when it does come, and anticipate a first-class season this year.

HOWLAND FLAT.—The *Mountain Messenger* says that this is the liveliest mining camp, excepting Forest City, at present in Sierra. All the drift and hydraulic mines are panning out a generous supply of gold, in such large quantities that the lucky owners of quite a number have succeeded in bonding their property for hundreds of thousands of dollars, on but a few months' time, when the probability is they will sell out to Eastern capitalists, whose intention is, in connection with others, to develop the vast comparatively unexplored rich gravel fields of the north on a grander scale than ever attempted heretofore in all the checkered career of our intrepid and adventurous wielders of the pick and shovel, since the inauguration of the industry of mining in the vast mineral belts of the Sierra Nevada.

But little river mining has been done around Coloma this season, except by Chinamen, owing to the high stage of water.

Miners' Permanent Relief Fund.

In some portions of England what are known as Miners' Relief Funds have been established, and have proved very advantageous. The plan is for the men to pay weekly out of their wages a sum which shall form a fund for the support of the families of those killed by accidents in mines. The idea is an excellent one, and could be followed with benefit in this country.

There is no reason why the relatives of those persons killed in mines should have to depend on public generosity. Public charity need not be evoked every time there is a great calamity. The men, when in employment, by the payment of a small weekly sum, can ensure their families against want, in the event of their meeting with accident, and to do this is no more than a duty. The value of the Miners' Relief Funds in the case of a calamity involving heavy loss of life, has been most forcibly shown in connection with the Seabam colliery explosion. Of this, the *London Mining Journal* says: "Unlike the miners in South Wales (where colliery explosions have been most frequent and fatal), who refused to subscribe toward a fund for the support of the families of those killed by accidents in mines, those in Durham for years past have been cheerfully paying a sum weekly to maintain those connected with them in case of death. The result has been that when the explosion took place at Seabam there was a sum of no less than £30,000 to meet the claims of the widows and children, so that in one day more than £1,000 were paid to the sufferers. There was no necessity for an appeal to the public to relieve the immediate wants of those who had been bereft of their breadwinners. Charity was in no way invoked; the provident habits of those who were killed were sufficient after death to ensure ample provision for those they left behind them. In the history of our mining operatives and mining fatalities on no previous occasion has there been recorded the interesting fact that relief for all the sufferers had been provided before the sad occurrence took place. Nine years ago at the same colliery an explosion took place, killing 26 men, half of whom belonged to the permanent relief fund, while the other half were outside of it. A public fund was raised, and the same, we are told, has been administered unequally, and ever since there has been general dissatisfaction in the neighborhood. On the occasion of the recent explosion all the men are in the society, and the relatives of all are to be treated alike."

Locations or Mines.

A mining location is not a mine by any means, though many persons think it is. The people who do are those who first come into a mining camp and those who buy stock in any company which is advertised, without knowing anything about it.

The new comer in a new camp is apt to think a staked out claim is a mine, the same as he thinks a six-foot hole in the ground is a shaft. He thinks his mine is as good as anybody's and perhaps better than an old one, since there has not been so much taken out. He is apt to ask a figure nearer \$50,000 than \$5 for each a claim, especially after he has blasted and dug away at it for a few months.

Calling a location a mine, however, don't by any means make it one unless it is to be "put upon the market." In that case, one is as good as another very frequently, for paper certificates are the basis rather than ore deposits in many of the new companies. It sometimes happens, and pretty often, too, that these holes in the ground are sold as mines to people who don't know any better, and they therefore have a commercial value after all.

It takes a long time for a community to learn the difference between locations and mines, and it is a question it is not always safe to leave even to "experts." They sometimes mistake the one for the other, a mistake some one else usually has to pay for.

HYDRAULIC MINING.—The hydraulic miners are now all busy getting ready for the winter season. Dams have to be tightened and put in order, ditches repaired, strengthened and cleaned, blocks have to be cut and laid away ready for the boxes, so as to save interruption in work. Wood must be laid in, and a hundred and one other things prepared for the rainy season. From many points of the hydraulic mining region come reports of anticipation of a busy and prosperous season. This year has been a good one for the miners, and the coming one is expected to be good also. Water everywhere is now at its lowest stage, so it is a favorable time to prepare for the rain. The provident miner is ready for it when it comes, so as not to lose a drop of the precious fluid.

It is reported that Mr. Hale paid for a controlling interest in the Robertson reduction company somewhere between \$250,000 and \$500,000.

Five mines paid \$136,250 in dividends at New York in September, and one paid \$50,000.

Oakland Harbor.

Work is now to be vigorously prosecuted on the improvement of Oakland harbor. The contract for finishing the training walls has been let to Dennis Jordan for \$80,000, the work to begin by October 25th, and to be done at the rate of 8,000 tons of rock per month on the walls, which are to be riprapped. From 4 to 6 ft. of stone-work is necessary to put on the top of the walls, as they now are, to bring them above high-water mark. About 75,000 tons of rock will be utilized in this work, and it is to be prosecuted to a speedy completion. From 8 to 12 schooners, each carrying from 80 to 120 tons of rock, will be used in the work, carrying the rock from Point San Pedro to the harbor. No dredging will be done until the walls are finished.

It may be that during the winter months barges and tugs will be employed instead of sailing schooners, for carrying the rock, especially as it must be transported some distance. In the other contracts on these walls the rock was brought from Goat or Angel island, part being from each. These are both Government quarries, however. This time the rock is to come from a private quarry of Mr. McNear's at Pedro point, near the Sisters islands, northeast of San Rafael. At this point there is an excellent quarry and the rock can be readily handled from it.

The walls, as they now are, have been very much flattened down since work was stopped on them. In taking the slope brought about by the action by the water on the rocks, the center line of the walls has been thrown to one side 15 or 16 ft.; that is, in some parts, the sea has pounded and flattened the wall so that its center line has been moved to one side of its original position.

The delay in the work has no doubt done as much good as harm. The walls have settled down permanently, and there is now a good foundation for the work. It is expected that the channel will deepen when the walls have been carried above high water, and if it does not, dredging will be done so as to give a uniform depth. The channel between the ends of the walls and the shore has not shoaled, but above the bridges, the creek and basins have materially shoaled of late.

Results of the Imperial Accident.

A short time since we chronicled a disastrous accident in the Con. Imperial mine in the Comstock, by which a number of men were killed. A number of experts testified that the cable was rotten and not fit for use for the purpose for which it was applied. The Coroner's jury charged the company with criminal carelessness. Now, Henry Ryder, administrator of the estate of Richard J. Ryder, deceased, has commenced action against the Con. Imperial M. Co. for \$25,000 damages. The plaintiff is brother to the deceased, who was one of the victims of the late accident at the Con. Imperial. The complaint alleges carelessness on the part of the employees of the mine, and the use of a rotten, imperfect and unsafe cable, causing the accident by which deceased lost his life.

Messrs. Lindsay & Dickson are plaintiff's attorneys, and during an interview with a *Gold Hill News* reporter, Mr. Lindsay said he had two or more suits to bring against the Con. Imperial on account of the same accident, and had been consulted in still other cases which would be put into his hands. He thought Lewis & Deal and Woodburn and Tuska had similar cases, but they did not know how many, in all were likely to be brought. He said, moreover, that the company refused all offers to compromise, and told the plaintiffs to go ahead with the suits. The officers of the defendant refused to offer anything whatever to settle the matter.

NITRO-GLYCERINE POWDERS.—A very important case has been on trial for some time in the U. S. Circuit Court in this city, entitled the *Giant Powder Co. vs. the California Vigorite Co.* Mr. Justice Field delivered judgment in favor of the defendants. The suit was brought for the alleged infringement of a re-issue of Nobel's patent for rendering nitro-glycerine safe for use, storage and transportation. The original patent covers a compound of nitro-glycerine and any inexplosive, porous absorbent which will take up the nitro-glycerine and render it safe for transportation, use or storage without destroying its explosive power. The re-issued patent, dated March 17th, 1874, enlarges the scope of the invention so as to embrace a compound of nitro-glycerine with any porous substance, explosive or inexplosive. Mr. Justice Field held that a patent could be re-issued only for the purpose of correcting mistakes, and not for purposes of enlargement, and that, consequently, the re-issued patent is invalid. This suit was instituted about a year ago and has been considered a very important one. The decision is supposed to dispose also of the pending suit of the *Giant Powder Co. vs. the Vulcan Powder Co.*, the same question arising in both. The decision, which is quite voluminous,

More Stamps than Ore.

One of the commonest of mistakes new mining companies make is that of putting up mills before the mines are properly developed. An other mistake which is becoming common, is to build mills of a capacity far beyond the needs of the mine. It seems big to say "a new 40-stamp is being built," or "20 stamps will be added to the mill to keep crushing facilities up with the ore production." These things help to sell stock, but they don't do any good to the mine in the end. In fact, such things usually react.

A case in point recently occurred in Amador county at the Monterichard mine. The mine was sold some time since, and lately it has been reported that the mill and mine would be shut down. The *Ledger*, while denying this, says it will be kept running for some little time at least. It says further: "The truth is, the mine was sold for a good round sum on the strength of grossly false representations. The ledge is very narrow, of fair quality what there is of it. There never were any developments to justify the putting in of the 10 additional stamps, and the quantity of rock now being extracted is nothing like sufficient to keep the mill running to its full capacity. A four or five ft. ledge of the same quality ore would make a paying mine, but instead of this the ore-body rarely reaches two ft. in width. The superintendent has been encouraged the last few days by the ledge showing 18 inches of good-paying rock, but while this is encouraging, it does not warrant any sanguine expectations of the future of the mine."

MINERAL LANDS.—A case is now being tried in the Supreme Court of the United States, which is regarded as a test case, which is of importance to many people in the State, and in which B. F. Butler has been retained to represent the interests of California vs. the United States, George A. Nourse being the attorney for the Government. The case is to determine the ownership of the minerals on the 16th and 36th sections of land in the townships of all lands granted by the United States Government to the State of California in 1854. It seems that Amador City is situated on the 36th section of one of these townships and the Keystone mine owned by the Pacific Bank in this city, and worth three or four millions of dollars, is located in that town. The mining company claims not only the gravel deposit, but the lode also, relying on its purchase from the State of California. On the part of the United States, it is claimed that the lode and mineral of all kinds was reserved to the Government, and that by the terms of the grant the United States never parted with its title to the minerals which might be under the ground. In other words, only the surface of the soil was granted. The case was tried here before Judge Sawyer, who decided adversely to the State of California, and an appeal was taken to the United States Supreme Court. When Gen. Butler was first here he was employed by the State to prosecute the appeal, and Mr. Nourse is now in Washington city to act for the United States. The town of Bodie is also located on one of these sections, and the decision of the Supreme Court will be anxiously looked for.

MINING CAMPS IN WINTER.—Now that winter is almost upon us, the army of prospectors which has been scattered over the mountains during the past 6 months will begin to gather in the camps. At the same time the camps themselves are dull in the winter as a general thing, and want less, instead of more people. In many of the mining towns of this coast comparatively little work is done in the winter, and consequently fewer hands are employed. This of course brings hardships upon the unemployed. Those who can afford it prefer to live in the larger places during the winter, but the working miner cannot always choose his abiding place to suit himself. Concerning the prospect in the Comstock, the *Virginia Enterprise* says: As the grass is liable to be very short here this winter, quite a crowd of miners will probably leave the Comstock for various mining camps in Montana immediately after the Presidential election. All young and unmarried men who can get away should strike out, and give men who are tied here with families a chance to make a living; otherwise much destitution will be seen in the city before next spring. It is always easy enough for young men to get back here in case of the striking of a bonanza and a demand for miners. Just now the demand is in Montana.

DOS CABEZAS DISTRICT. distant 11 miles from Wilcox station, S. P. R. R., is attracting quite a rush of mining men on account of its recent developments. The ledges are not only numerous, but rich. Quite a settlement has sprung up in that district within the last month.

THE CENTRAL CITY gold district, of Colorado, keeps 17 quartz mills, besides partially supplying many extensive smelters. Over 600 stamps are now at work, crushing 450 tons of ore daily.

Practical and Theoretical Mining.

Every one will admit that even a modicum of scientific knowledge will do a practical miner no harm even if it does him no good; and that attendance at mining lectures cannot but benefit in some degree the practical man who attends them. Still there are men who will sneer at what they call book knowledge, and think "practice" is the only thing of any value. Lecturers on mining never intend that their discourses should be all that a student needs who intends to make mining his profession; they intend that their lectures should be supplemented by practice. It is clear that the necessary practice can easily be obtained in mining schools situated in mining districts, and in such districts, practical mining usually, if not universally, forms part of the curriculum. At the mining school at our University of California, lectures are given on mineralogy which teach the student to know the minerals when he sees them; and lectures are given on metallurgy, which teach him how ores of different classes are worked. It is not pretended, however, that this instruction alone will fit a man to take charge of a mine.

In answer to some objections to what is styled theoretical teaching Mr. E. Halse writes to the *London Mining Journal* a letter in which he makes the following sensible remarks:

The Royal School of Mines, being situated in London, cannot teach its students practical mining without very greatly increasing the cost of training; they must obtain that knowledge during the vacation, or after they have gained their diplomas. The school does all it can by thoroughly grinding the students in all the sciences in which mining proper is built, by providing a most able lecturer on the subject, and by exhibiting numerous minerals from all parts of the inhabited globe, and many models of mines and mining machinery. When the student leaves the school he has attained such a thorough grasp of the principles of mining, and of the details of the machinery connected therewith, that a fair proportion of practical knowledge makes him competent to manage any mines in the world. He has no local prejudices, nor—worst of all—the prejudice of ignorance. It is not necessary for him to grope all his life "in the bowels of the earth." If he is not the dullest of mortals, he will soon acquire the use of the pick. Enthusiasm and patience are his best teachers in the use of this tool. After a time—I speak from practical experience—he will be able to feel, as it were, the hardness of different kinds of rock, and know at once from its use the cost per fathom of driving such rock. If he is in the smallest degree an observer, by studying the changes of a lode from day to day, he will learn more of the real nature of lodes in a couple of years than most practical miners learn in a lifetime. The knowledge of the proper use of the dial will enable him to avoid some of the atrocious blunders into which some practical miners steer.

Mining has suffered little if at all from mining students, who, as a rule, take a pride in their profession, and who endeavor all they can to raise its tone; but mining has suffered terribly from ignorant, bigoted and unprincipled men who are pleased to call themselves "practical," and whose chief occupation is telling lies and pocketing fees. Such men may form but a small section of practical miners, as I trust they do, but they are, nevertheless, a very powerful section for evil, and have done more to debase mines and mining than the blunders of a million directors. But there are many men, essentially practical, who can "look the whole world in the face," for they are honest and straightforward. It is a pleasure to know such men, for they are ever eager to learn the sciences that lie at the root of mining, and are quite as ready to impart their practical experience, which is often very great, to others. But if men, who, though honest, no doubt, and otherwise estimable, close their eyes to any and every kind of knowledge that is gained by books and oral teaching it will soon be said, "Otello's occupation 's gone!"

UNASSESABLE MINING STOCK.—The practice of issuing unassessable stock, that is in vogue with Eastern mining companies, is by no means calculated to advance the interests of honest enterprises. Often the best of new prospects are compelled to shut down at the very time that they give promise of developing into self-sustaining mines, for the simple reason that the original working fund is exhausted, and a small minority of the parties interested, who know nothing about mining, cannot be made to see why their claim has not made from the grass-roots. There have been three notable illustrations of this state of affairs in Nevada county within a few months past. Eastern capital is a good enough thing to have come in here, but when it is hemmed about by the narrow-minded laws that govern Eastern incorporations, it frequently proves a detriment to the district by being lost to the investors, who draw out of the light before they are fairly in it.—*Nevada Transcript*.

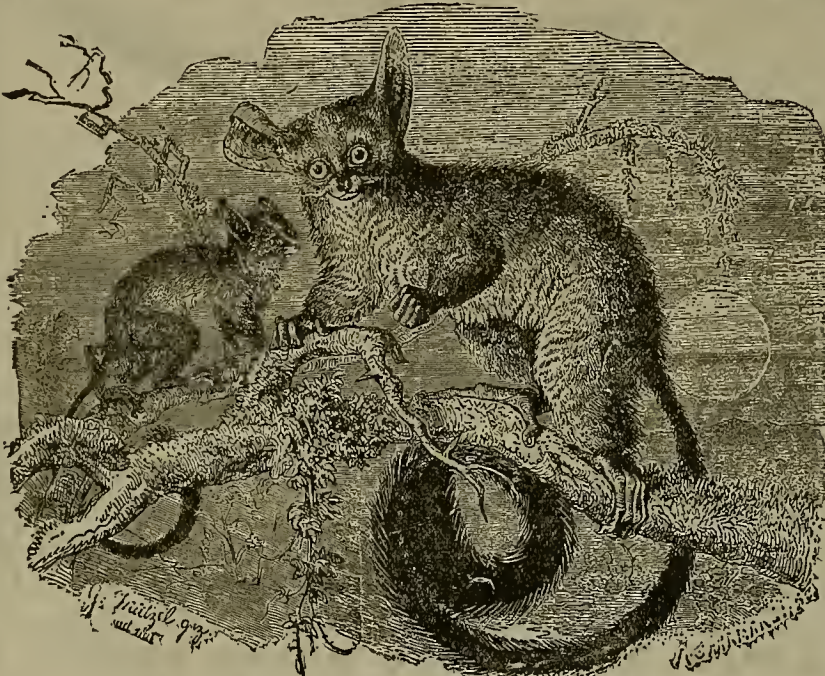
THE CINCINNATI INDUSTRIAL, fair was a financial success.

A Curious Animal from South Africa.

Our engraving shows the Moholi (*Galago moholi*), an inhabitant of South Africa first seen by the explorer, Dr. Smith, hopping about the branches of the trees that bordered the Limpopo river, in 25° south latitude. The moholi galigo is nearly 16 inches in length, inclusive of the tail. Its color is gray, with irregular markings of a deeper hue. The under parts of the body are nearly white, and the limbs are slightly tinged with a golden luster. The tail is not very bushy, excepting at the extremity, and its color is a chestnut brown. The texture of the fur is very soft, and there is a slight wooliness in its setting.

Nocturnal in habits, it sleeps during the day, with its large ears folded over the head in such a manner as to give it the aspect of an earless animal. The moholi does not secure its prey by stealing on it with slow and silent movements, but leaps upon the flying insects on which it loves to feed, and seizes them in its slender paws. Besides insects, various fruits form part of the moholi's food, more especially such as are of a pulpy nature, and it is said that the moholi eats that vegetable exudation which is known by the name of gum senegal. Its diurnal repose is taken in the curious nest which it builds in the forked branches of trees, using grasses, leaves and other soft substances for the purpose. In this lofty cradle the young are nurtured until they are of an age to provide for themselves.

The face is full of expression, in which it is aided by the large and prominent ears; and the creature is said to contract its countenance into

THE MOHOLI (*Galago moholi*) FROM SOUTH AFRICA.

strange grimaces, after the fashion of the ordinary monkeys. Like the monkeys, too, it can leap for some little distance, and spring from one branch to another, or from tree to tree, with agility and precision.

A DISCHARGED MINER KILLS A SHIFT BOSS.—Michael Carbis, shift boss in the California mine, at Silver Reef, Utah, was stabbed Sunday morning, the 3d inst., by Thomas Forrest. Forrest had been discharged from the mine by Carbis, who had been ordered to do so by the foreman, Johnson Vivian. Mr. Carbis was just above the Buckeye mine, on his way to the California, when Forrest, who had evidently been lying in wait for him, rushed upon Carbis and stabbed him in the left side, inflicting a mortal wound, and he died at 5 o'clock that evening. An eye witness to the assault immediately came to Silver Reef and reported it to Deputy Sheriff Hoag, who at once started out with a detachment in pursuit of Forrest. By the aid of Indians, Forrest was tracked to the Tecumseh Tunnel, where he was arrested and lodged in jail, and on Monday he was taken down to St. George and placed in jail there. Tuesday night Forrest was taken from jail, and it is supposed by citizens from Silver Reef, and hung to a tree. Forrest was employed in Pioche in 1871 as a "fighter." Michael Carbis was a respected citizen of Silver Reef, and had lived for several years in Pioche. He is an old pioneer of this coast, having resided for a long time at Grass Valley, California.

NATIVE PORCUPINE.—Josiah Pool, of Isleton, informs us that near Woodworth's wharf, on Andrus island, some dogs were recently discovered hating, with doubtful result, with what was supposed to be an enormous ooon. To assist the dogs the animal was dispatched with an ax, and afterwards discovered to be a genuine porcupine, quills and all. Question—Where did it come from?

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

ELECTRICAL RECORDING TARGET.—Richard H. Savage, Empire Foundry, San Francisco Patented Sept. 21, 1880. No. 232,417. This invention relates to a self-recording target and indicator for small-arm practice, which is also useful for testing guns, cartridges and powder for penetration, as well as accuracy of aim, as well as to record time of flight of projectiles. It consists of a target which is subdivided into a number of areas, each of which is properly supported and guided, and is free to move backward upon the impact of a shot and be returned to its place by the action of elastic buffers, springs or hinges, in combination with certain details of construction. It also consists in a combination of wires, sectional target, a timing device, and the weapon being fired, whereby the velocity of the shot is measured.

BREECH-LOADING FIRE ARM.—Charles Slotterbeck, Lakeport, Cal. Patented October 5, 1880. No. 233,034. This device relates to certain improvements in breech-loading guns of that class in which the barrel is hinged to the fore end of the stock, so that when unlocked it tilts in a vertical plane. It is especially adapted to be used for a single-barreled, breech-loading rifle, in which great solidity of action is necessary to prevent derangement in the accuracy of its shooting. It consists in an improved construction of the fore-end joint, by which a

A German Patent Exhibition.

A "general German patent and registered articles exhibition" will be held at Frankfurt on-the-Main from the 1st of May to the 30th of September. For the first time will the opportunity be given of subjecting the patents obtained in the German empire to general judgment, and of proving publicly the value of the inventions and improvements made. The promoters think that by means of this exhibition large amounts of capital can be obtained by the inventor or owner of patents. Up to the present time the co-operator, without whom the practical development of an invention cannot be effected, has often been searched for in vain in the money market.

The main object of the exhibition is to bring to public notice the greatest novelties in the domain of inventions and designs. It is intended to afford the inventors an opportunity for bringing forward their inventions, and the public an opportunity of judging them from personal inspection. The inventors are to be thereby afforded the possibility of more remuneratively disposing of their productions, and the capitalist will be induced to combine with the inventor for their mutual co-operation and benefit. The German nation, on the other hand, will be thereby encouraged to bring its inventive faculty more into action and public notice than heretofore, and to compete with other nations in the production of new things and in supporting important undertakings.

It is therefore intended in the first place to exhibit such objects as are prepared (a) on the basis of German patents, whether old or new, expired or in force, or only applied for at the German Patent Office, without reference to whether the objects have been prepared in Germany or abroad. (b) On the basis of important inventions for which it is not intended to obtain patents; but only in so far as these objects are manufactured in the German Empire. (c) On the basis of the design laws of the German Empire, and legally protected there whether the objects be made in Germany or abroad.

Only "those things will be admitted which are produced by a German patent, actually made in the German Empire, or manufactured under German design laws. A stated price is charged exhibitors for space, power, etc.

This is a good opportunity for American inventors, who have German patents, or who intend applying for them, to exhibit their articles. We have at this office copies of the circulars issued to inventors, which may be seen by those desirous of examining them.

A SELF-EXTINGUISHING SAFETY LAMP.—In an improved mining lamp lately invented in England, the clock instead of being an ordinary screw as used in the present lamp, is a beveled steel bolt fitted vertically into the reservoir of the lamp, and projecting through the top is kept in position by a steel spiral spring contained in a tin cylinder fixed inside the reservoir of the lamp. A steel stud is screwed in the side of the outer case, and projects about 3/16ths of an inch inside the lamp, passing a bolt on the beveled side when screwing up the lamp, and consequently locking itself. To open the lamp it is necessary to release the rod from the loop at the bottom of the lamp, and draw it downwards until the lower edge of the extinguisher comes in contact with the top part of the bolt, and which will bring the under side of the top of the extinguisher about 1/2 inch above the burner tube; by continuing to draw the extinguisher down, it puts out any light that may be in the lamp, and at the same time allows the stud to pass the bolt on the top of its beveled part, when the lamp can be unscrewed in the ordinary manner. When the pressure is taken off, the bolt resumes its original position by means of a spiral spring. The extinguisher is made with corrugations at the side and a number of small holes at the top to allow the flame to escape above it, preventing the possibility of the flame escaping through the gauze by the too quick drawing down of the extinguisher.

SILVER PEAK AND LIDA.—Parties who have recently returned from Silver Peak and Lida Valley, and the country in that section, report the mini outlook very favorable. Everywhere that any work is being done the mines show well. The entire range is one mass of mineral, and wherever prospecting has been pursued to any definite extent the showing has been more than satisfactory. When the country becomes more closely connected with the balance of the world by rail and other communication, it is certain to make itself felt in mining circles.—*True Fissure*.

DITCH WORK.—The South Yuba water company will commence on the 5th of next month to enlarge and clean their ditches extending from the South Yuba river to Blue Tent, which is about 30 miles in length. About 100 men will be employed for such purpose, and the work will probably be finished in about a month. The reason why the South Yuba company intends to enlarge the said line of ditch is in order to afford the Blue Tent Gravel mining company a larger supply of water which will be an increase of 1,000 inches.—*Nevada Herald*.

LICENSE COLLECTOR SINTON on Tuesday forwarded to the State Treasurer, by Wells, Fargo & Co., \$3,920.60 on account of the State Mining Bureau.

THE Tombstone mill and mining company of Arizona have declared their seventh dividend of 10 cents per share, payable at Philadelphia on the 15th of October.

BUENOS AYRES has been declared by the Senate to be the capital of the Argentine Republic.

Bechtel New Works.

A *Standard-News* reporter strolled into the new shaft house of the Bechtel mine late yesterday afternoon to see the new machinery at work, and to his astonishment found the new works the most complete and substantial on the lead. The new machinery consists of a double engine of 12 by 14 inch cylinders, recently manufactured by Prescott, Scott & Co., of San Francisco, a Corliss valve to feed the cylinders, and a No. 2 Cameron pump to feed the boiler. The boiler is 16 ft. by 50 inches, and is enclosed in brickwork substantially braced and bolted by heavy iron bars. The engines, reels, etc., rest upon a Corliss cast-iron bed, securely bolted to a granite foundation. The engines have ample

Capacity for Sinking 1,500 ft.

The crank shaft is five inches and the reel shaft eight inches in diameter. The spur wheel is 10 ft. in diameter, and has a 12 inch face and three inch pitch—between cogs. Compound brakes of the most substantial character give perfect safety, and the reels can be stopped instantaneously by pressing the foot upon the brake-bar where the engineer stands. There are two large reels, one on each side of the spur-wheel, but at present but one of them is in use. Each reel has 1,500 ft. of new wire cable of the best manufacture, the cable being four and a half inches wide and five-eighths of an inch thick. The gallow's frame is also of the most substantial character, and in fact, every thing about the new shaft works as smoothly and almost as noiselessly as a sewing machine. The fine

Double-compartment Shaft.

Is now down 119 ft. below the 400 level, and being sunk with remarkable rapidity. The shaft is being substantially timbered as sunk, and the new safety cage, which runs as smooth as a skate on ice, is provided with long iron shoes, which extend up the guides far enough above the cage to permit of the latter being lowered to the bottom of the shaft the full length of two sets of timbers below the timbers and guides. Thus the cage with a car goes to the bottom where the men are sinking, 10 ft. below their guides, the car is loaded and hoisted with as little jar, and as little danger, as if the guides extended to the bottom. This arrangement greatly facilitates sinking. The building over the new works is a most substantial and capacious one, affording room for a carpenter shop, blacksmith and machine shop. The latter has not yet been provided, if we except a fine drill press, which is already in place and is to be run by steam; but it is understood that a lathe and other necessary machinery will soon be added.

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Law Office, No. 636 Clay St., room 25, S. F.

New Book on the Comstock.

The attention of MINING ENGINEERS and EXPERTS is called to the new work by JOHN A. CHURCH, E. M. Ph. D., on "The Comstock Lode, Its Formation and History." This very exhaustive treatise on this famous lode is fully illustrated with diagrams and colored charts showing sections, ore bodies, etc., and will be of great interest and permanent value for reference. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, are sole agents for the sale of the work. Mr. E. M. SLEATOR will act as their agent, and call on Mining Engineers and those interested in the great lode in this city with a copy of the book for their

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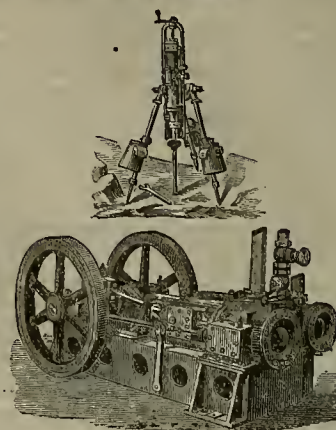
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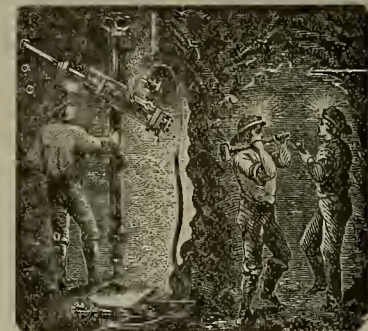
This is the Best and Cheapest Window Screen ever offered to the public. Useful and Ornamental.

To exclude Flies and Mosquitoes, it has no equal. It is an article of comfort, convenience and economy, and needs only to be known to be deemed a household necessity.

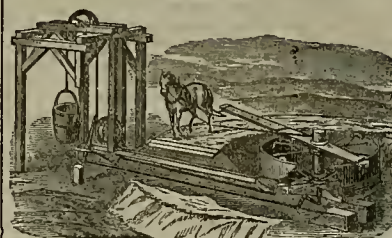
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The Most Economical Air Compressors in the Market.

**MINERS' HORSE-POWER.**

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a horse by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing

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Having been engaged in furnishing these supplies since
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AND
Ore Pulverizers.

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The furnace is especially adapted for roasting rebellious
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The Ore Pulverizer is built in different sizes. It is prefera-
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Lap-Welded Pipe, all Sizes, from Three to Six Inches. Artesian Well Pipe.
Also, Galvanized Iron Boilers, from 25 to 100 Gallons.
Iron Cut, Punched, and Formed for making Pipe on ground, where required. All kinds of Tools
supplied for making Pipes. Estimates given when required. Are prepared for coating all size of
Pipes with a composition of Coal Tar and Asphaltum.
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WORKING PLACER, GRAVEL AND QUARTZ MINES,
SAVE YOUR GOLD!
- BY USINO -
SILVER PLATED AMALGAMATING PLATES.
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percentage of gold than any other method.
SWING AND RIFFLE PLATES for Saving Float Gold Made to Order.
OLD MINING PLATES BOUGHT, TAKEN IN EXCHANGE FOR NEW, OR RE-PLATED.
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MINING ENGINEER AND METALLURIST.

Concentration of Ores (of all kinds), including
the Chlorination Process for Gold-bearing Sulphurets,
Arsenurets, and Gold and Silver Ores generally, with
120 Lithographic Diagrams. 1867.
This work is unequalled by any other published, embracing
the subjects treated. Its authority is highly esteemed
and regarded by its readers, containing, as it does, much
essential information to the Miner, Metallurgist,
and other professional workers in ores and minerals, which
cannot be found elsewhere in print. It also abounds
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Books for Miners and Millmen.

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U. S. Mining Laws, Digest of Decisions, Forms, etc. 1877.
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CHLORINATION PROCESS,

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Working Gold Ores,

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Refractory Sulphurets,

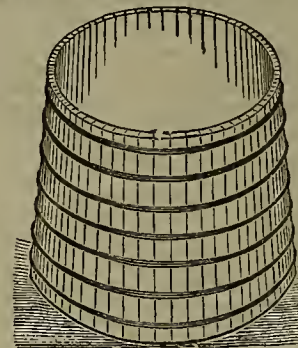
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Member of the Jury on Wood-working Machinery at Paris
Exposition of 1878.

This thorough work, impartially written in a clear, simple
and practical style, treats the Saw scientifically, analyzing
its action and work, and describing, under the leading classes
of Reciprocating and Continuous Acting Saws, the various
kinds of large and small hand, cash, Mulay, jig, drag, cir-
cular, cylinder and band Saws, as now and formerly used for
crosscutting, ripping, scroll-cutting, and all other sawing
operations in wood, stone and metal, ice, ivory, etc. In this
country and abroad. With appendices concerning the details
of manufacture, setting, swaging, gumming, filing, etc., tables
of gauges, log measurements from 10 to 24 feet, and from 12
to 36 inches, lists of all U. S. Patents on Saws from 1790 to
1880, and other valuable information. Elegantly printed on
extra heavy paper, wide margin, copiously indexed.

Owing to an increase of nearly 100% in number of pages and
illustrations since first projected, the price is this date made
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624, 626 and 628 Market Street, Philadelphia
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The undersigned, owners of LESCHOTS PATENT
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highest state of perfection, are prepared to fill orders
for the IMPROVED PROSPECTING AND TUNNELING
DRILLS, with or without power, at short notice, and
at reduced prices. Abundant testimony furnished of
the great economy and successful working of numerous
machines in operation in the quartz and gravel mines
on this coast. Circulars forwarded, and full infor-
mation given upon application.

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The California Architect and
Building Review.

Office, No. 240 Montgomery Street, San Francisco, Cal.
It is with pleasure that we publish the following from
prominent Architect in this city:

Believing that a journal of this kind is a necessity on this
coast, and judging from what has appeared in the "Quarter-
ly Architectural Review," we are led to believe that the
CALIFORNIA ARCHITECT AND BUILDING REVIEW
will be worthy of generous support and encouragement. We
therefore pledge our cordial sympathies, personally, and hope
that the enterprise will receive a kindly recognition and liberal
support from all Architects and Builders and the public gen-
erally. (Signed) David Farquharson, Wright & Saunders, S.
H. Williams, Thos. J. Welsh, F. Hume, John Marquis, B.
McDougal & Son, Wm. Moser, Wm. Curlett, Meeker &
Banks, W. O. Hoagland, S. & J. Newson, B. Henriksen

PACIFIC POWER CO.

Room with steam power to let in the
Pacific Power Co.'s new brick building,
Stevenson street, near Market. Eleva-
tor in building. Apply at the Com-
pany's office, 314 California street.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING OCTOBER 5th, 1880.
232,799.—WINDMILL—J. R. Bachelder, Napa.
232,878.—ORE STAMP MILL—R. F. Bridwell, S. F.
232,939.—ATTACHMENT FOR VALVES—S. B. Connor and H. Duds, Virginia, Nevada.
9,395.—SAVES MAKER'S FLOAT—(Reissue), J. W. Forard, S. F.
232,887.—BAY—H. P. Garland, West Berkeley, Cal.
232,933.—VALVE—F. Giovannini, S. F.
232,959.—VISE—E. O. Hall, Ione, and C. D. Smith, Amador, Cal.
232,845.—GANO PLOW—T. Powell, Stockton, Cal.
232,846.—ROCK REW—D. Rankin, S. F.
232,040.—ROCK DRILL—H. Richmann, S. F.
232,852.—ANNUNCIATOR—T. J. Sablin, S. F.
333,034.—FIRKARM—C. Slotterbeck, Lakeport, Cal.
NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

The Knox & Osborn Mine.

The Knox & Osborn mine (formerly known as the Boston) is situated in Buckeye gulch, about 2½ miles from Mokelumne Hill. It is worked from two tunnels known as the east and west tunnels respectively; they both commence from the head of Buckeye gulch and follow the vein with the mountain. The east tunnel is now in 100 ft. following the east wall. The face of this tunnel is in low grade ore which will mill from \$3 to \$5 per ton in gold. The west tunnel follows the foot wall, is in 220 ft., and has passed through fair grade milling ore from the start, that is, ore that is thought to contain from \$6 to \$10 per ton in free gold, and the concentrations from \$2.50 to \$3 more. A crosscut from the west tunnel to the hanging wall has been run, showing the ledge to be 60 ft. wide from wall to wall, and it is safe to say that the entire body of quartz between the walls will pay by milling process from \$6 to \$8 per ton, possibly not over \$4. Two-thirds of the gold is free and consequently can be saved on copper plates. The crosscut is run from a point 110 ft. from the mouth of the tunnel, where also an air shaft has been raised to the surface on the footwall 125 ft. and pay quartz found clear to the grass roots. At the top of this air chute or shaft the third tunnel or adit level has been started on the course of the vein, and is also in a corresponding grade of quartz to that of the west footwall tunnel. This third or upper tunnel is in about 25 ft. The first two tunnels have car tracks in them. The east tunnel being some 25 ft. lower than the west tunnel, it is an easy matter to keep the mine well ventilated by a series of crosscuts.

In addition to the mine developments, the Knox & Osborn Mining Co. have commenced and nearly completed a 20-stamp water-power quartz mill, which is situated some 70 ft. below the level of the mouth of the tunnels, and is connected with them by a car track. The facilities are first-class for cheap and economical handling of the quartz. It is hoped by the owners that when greater depth shall have been attained, a better quality of ore will be met with, but even with the present grade of quartz the mine can be made to pay all running expense beyond a doubt. There is now on the dump and ready for the mill some 2,000 tons of quartz, and from 40 to 50 tons per day can be broken to keep the mill busy when it is ready to run which will be in two or three weeks from the present writing.

The Knox & Osborn being so near to Mokelumne Hill, its success would tend to revive business here and give confidence and encouragement to others to do as Messrs. Knox & Osborn have done in putting their capital and energy in the abandoned and heretofore supposed worthless mines of this district. We sincerely hope that the owners will more than realize their expectations, for they deserve success, as they have already expended about \$30,000 and expect to be out still more before they look for any return.—*Onlawas Chronicle*.

For the year ending June 30th, 1880, the issues of postage stamps, stamped envelopes and postal cards, on which the revenue of the Department mainly depends, aggregated in value \$32,087,342, a 9% increase over the previous year.

The Treasury Department has ordered that on the 15th inst. the work of printing the internal revenue adhesive stamps be transferred from the Columbia Bank Note Company of New York to the Bureau of Engraving and Printing in Washington.

Jono Yuo Sino, managing director of the China Merchants' Steam Navigation Company, of the southern ports of China, has arrived in Cuba to ascertain if it is feasible to open intercourse by steamer between China and Havana.

The springs in Santa Cruz county are increasing their volume and the streams are swelling their flow, which facts are taken as evidence of near approaching rains.

The Belmont mine, on Snake river, Idaho, was recently sold to a San Francisco company

News in Brief.

HEAVY rains have fallen at Yale, B. C. WILLIAM LASSAL, the English astronomer is dead.

A SERIOUS uprising of Kurds is reported from Teheran. TRAVEL to southern Arizona is rapidly increasing.

The victims of the Pittsburg collision now number 23. THERE is a great insurrection of Mohammedans in Kashgar.

SATURDAY was the ninth anniversary of the great fire at Chicago.

IMMIGRANTS to the number of 6,044 arrived at New York last week.

DURING last week 583 deaths occurred in New York city, and 522 births.

THE Montenegrans require money aid to keep up their present armament.

INDIANS are now compelled to reside outside the city limits of Victoria, B. C.

FOURTEEN deaths from yellow fever occurred at Havana during the past week.

THE track of the Southern Pacific railroad is now laid 18 miles in New Mexico.

DURING a hurricane at St. Michael, Azores, two British steamers were wrecked.

TROOPS have been ordered to the scene of Indian trouble in Washington Territory.

THE Laporte etage was robbed by highwaymen recently, near Brownville, Yuba county.

THE Sultan declares he would rather abdicate than give way to the demands of the powers.

WATER is lower in the ponds, rivers and lakes of central New York than was ever known before.

THE government will suspend the habeas corpus act in Ireland, if agrarian outrages continue.

INTENSE excitement prevails in Colorado over the recent butchery of young Jackson by the Indians.

THE rivers in Pennsylvania, Delaware and New York were never so low as they are at present.

It is again reported that Jay Gould has bought the New York *World*, paying therefor \$400,000.

THE German steamer *Asia*, from Amoy New York via the Suez canal, is stranded in the Indian ocean.

THE Secretary of the Interior has arranged for paying \$75,000 to the Utes, under the treaty with them.

THE corner stone of the obelisk was laid in Central Park, New York, Saturday, with appropriate ceremonies.

SECRETARY EVARTS declines to recognize Don Celso Caezar Moreno as the accredited agent of the Hawaiian government.

THE Monterey Whaling Company last week caught two fine whales of the humpback species—the first catch of the season.

THE report of the United States surveyors being driven from their work on the Skagit river, W. T., by Indians is confirmed.

THE House of Representatives of Mexico has declared Gen. Gonzalez President of the Republic, his term to begin December 1st.

SPOTTED TAIL asks for a fair trial for the young Indians of his tribe sent to Omaha for alleged offenses committed by them.

THE markets during the past week in the East, notwithstanding the intense political excitement, show but few changes.

THE National Board of Health sustains the recent report of the Inspector stating that yellow fever has existed on the lower Mississippi.

ONE of the murderers of Dr. Parsons, the American missionary, has been condemned to death, and 2 others to 15 years penal servitude.

BRADSTREET'S *Journal of Trade* estimates the wheat crop of 1880 at 465,000,000 bushels of which 134,000,000 bushels will be for export.

THE succession to the Roumanian throne has been definitely settled upon Prince Charles Antony, third son of Prince Leopold of Hohenzollern.

THE Buenos Ayres National Congress has proclaimed General Roca President of the Argentine Confederation. Perfect tranquility prevails.

CAPTAIN AYERS, the oldest railway conductor in the United States, died at Oswego, N. Y., last week. He was on the Erie railroad 33 years.

THE gross earnings of the 34 principal railroads for the month of September amounted to \$15,365,964, against \$12,551,557 for the same month last year.

THE *North German Gazette* says: We hear from St. Petersburg that China has given its Ambassador, Marquis Tseng, full power with a view to ending negotiations between Russia and China satisfactorily.

THE American and English Ministers to Chile are said to have sent a joint communication to the Chilean government, expressing a hope that hereafter foreign properties and lives will be more respected by its troops.

INVESTIGATION by the Census Bureau proves that the census of South Carolina has been accurately taken. Presumptive evidence is afforded that the census of 1870, taken under the census law of 1850, was grossly inaccurate.

NEW YORK advices state that San Jose de Guatemala will be the last port of call of the Pacific Mail steamers between Panama and San Francisco, the Mexican government having failed to pay the subsidy granted to the

GENERAL MERCHANDISE.

(WHOLESALE.)
WEDNESDAY M., Oct. 13, 1880.

CANDLES.
Eagle, 17 @ 17 1/2
Patent Sperm, 25 @ 30

CANNED GOODS.
Assorted Pie Fruits, 25 @ 25
Table Olives, 3 @ 30
Jams and Jellies, 3 @ 75
Pickles, hf gal., 3 @ 25
Sardines, qr box, 1 @ 75
Hf boxes, 2 @ 50
Merry, Faulk & Co., 2 @ 75

Preserved Beef, 2 lb. doz., 3 @ 60
Do Beef, 4 lb. doz., 5 @ 60
Preserved Mutton, 2 lb. doz., 3 @ 25
Beef Tongue, 6 @ 60
Preserved Ham, 2 lb. doz., 3 @ 50
Deviled Ham, 1 lb. doz., 3 @ 60
Do Ham, 4 lb. doz., 3 @ 60

Boneless Pigs Feet, 3 @ 50
3 lbs., 7 @ 75
Spiced Fillets, 2 lbs., 3 @ 60
Head of Cheese, 3 lbs., 3 @ 60

PAINTS.
Australian, ton., 5 @ 50
Gulls Bay, 5 @ 50
Sealboard, 5 @ 50
Cumberland, 12 @ 100
Mt. Diablo, 4 @ 75
Lehigh, 11 @ 50
Liverpool, 6 @ 60
West Hart, 3 @ 60
Scotch, 8 @ 80
Sorrento, 7 @ 50
Vancouver Id., 7 @ 50
Wellington, 7 @ 50
Chaco, sack, 7 @ 50
Coke, hush, 6 @ 60
Ground, in cs., 25 @ 25

COFFEE.
Sandwich Id. lb., 15 @ 16
Guatemala, 15 @ 16
Java, 24 @ 25
Mandis, 15 @ 16
Ground, in cs., 25 @ 25

FISH.
Sect to Dry Co., 4 @ 43
In cases, 5 @ 51
Eastern Ood., 7 @ 73
Salmon, bbls., 7 @ 75
Hf bbls., 3 @ 40
1 lb. bbls., 3 @ 30
Pick Ood., bbls., 3 @ 30
Hf bbls., 3 @ 30
Mackerel, No. 1, 9 @ 90
Hf bbls., 9 @ 90
In cases, 9 @ 90
Ex Mess., 3 @ 40
Pick Herring, 3 @ 30
Boston Smoked Hg, 6 @ 70

LEATHER.
Plaster, Golden, 3 @ 35
Gate Mills, 3 @ 35
Lead Plaster, 10 @ 12
Lime, Sta Cruz, 1 @ 150
Omelet, 1 @ 150
dalc., 2 @ 25
Portland, 4 @ 40
Assorted sizes, 4 @ 50

SOAP.
Castile, lb., 8 @ 15
Common brands, 4 @ 15
Fancy brands, 7 @ 8

SPICES.
Cloves, lb., 47 @ 50
Cassia, 19 @ 19
Nutmegs, 97 @ 110
Piper Grain, 19 @ 20
Mustard, Cal., 1 @ 25
1 lb glass, 1 @ 25

SUGAR, ETC.
Oat, Cube, lb., 11 @ 12
Powdered, 11 @ 12
Rice, 11 @ 12
Granulated, 11 @ 12
Golden O., 7 @ 10
Oat Syrup, 7 @ 10
Hawaiian Molasses, 25 @ 30

TEA.
Young Hyson, 40 @ 65
Moynie, etc., 40 @ 65
Country pack Gunpowder & Imperial, 35 @ 75
Hyson, 30 @ 35
Fook-Chow O., 27 @ 32
Japan, 1st quality, 40 @ 42
2d quality, 25 @ 40

METALS.
(WHOLESALE.)
WEDNESDAY M., Oct. 13, 1880.

IRON.—
American Pig, soft, ton., 32 @ 37
Scotch Pig, ton., 28 @ 30
American White Pig, ton., 28 @ 30
Oregon Pig, ton., 28 @ 30
Reinforced Bar, 41 @ 48
Horse Shoes, keg, 7 @ 8
Nail Rod, 1 @ 9
Nails, according to thickness, 8 @ 9

STEEL.—
English Oat, lb., 16 @ 18
Black Diamond, ordinary sizes, 13 @ 15
Drill, 9 @ 10
Flat Bar, 11 to 16 Kil., 14 @ 15
Flow Steel, 9 @ 10

OPPER.—
Ingots, 52 @ 52
Sheet, 21 @ 22
Sheets, Tinned 14x18, 21 @ 22
Nails, 33 @ 42
Old, 18 @ 18
E T Bar, 18 @ 18
Prestite, 100 line, 18 @ 18

LEAD.—
Pig, 42 @ 5
Bar, 42 @ 5
Pipe, 42 @ 5
P p, Soil, 42 @ 5
Shot, Discount 10% on 500 Bags, 2 @ 210
Drop, per bag, 2 @ 210
Bullet, 2 @ 210
Oiled, 2 @ 210

TIN PLATES.—
10x14 O Charcoal, 10 @ 10
10x14 O Coke, 10 @ 10
Banca Tin, 10 @ 10
Australian, 10 @ 10
I O Charcoal, Roofing 14x20, 21 @ 22
20x23, 21 @ 22

ZINC.—
By the Cask, 10 @ 10
Zinc Sheet 7x3 ft. 7 to 10, lb. less than cask, 10 @ 11
Nails, 4 @ 4
Assorted sizes, 4 @ 4

LEATHER.
(WHOLESALE.)
WEDNESDAY M., Oct. 13, 1880.

Sole Leather, heavy, lb., 3 @ 32
Light, 25 @ 32
Jodot, 8 to 10 Kil., doz., 36 @ 48
11 to 13 Kil., 50 @ 60
14 to 16 Kil., 50 @ 60
Second Choice, 11 to 16 Kil., 40 @ 50
Simon Ulmo, Females, 12 to 13 Kil., 52 @ 60
14 to 15 Kil., 61 @ 65
16 to 17 Kil., 67 @ 70
Simon, 20 Kil., 61 @ 65
24 Kil., 70 @ 75
Kips, French, lb., 1 @ 1.37
Cal. doz., 48 @ 48
French Shoe, all colors, 13 @ 15
Eastern Calf for Backs, lb., 1 @ 1.25
Sheep Roans for Topping, all colors, doz., 9 @ 10
For Linings, 6 @ 10
Cal. Russel Sheep Linings, 4 @ 5
Root Legs, French Calf, pair, 4 @ 4.50
Good French Calf, 4 @ 4
Best Jodot Calf, 4 @ 4.50
Leather, Harness, lb., 45 @ 45
For Bridle, doz., 35 @ 37
Skirting, lb., 33 @ 37
Welt, doz., 30 @ 35
Buff, ft., 17 @ 20
Wax Side, 19 @ 20

Gold, Legal Tenders, Exchange, Etc.
(Corrected Weekly by SUTRO & Co.)
SAN FRANCISCO, OCT. 13 P. M.

SILVER, 1
GOLD BARS, 890 @ 910. SILVER BARS, 10 @ 18 cent. 10
SOUT.
EXCHANGE on New York, 17 @ 20, on London bankers, 42 @ 42
42, Commercial, 50; Paris, five francs @ dollar; Mexican dollars, 1 @ 23.

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Australian Patents.

The attention of Pacific Coast Inventors is called to the benefits which may be derived from Letters Patent of the Australian Colonies. We invite correspondence from all who may desire full information on the subject. The geographical location of San Francisco gives an advantage in our favor over Eastern agencies, rendering it possible for us to transact business in much less time.

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SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grout walled with aquaria constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

J. G. COLMERE is requested to report to this office. He went to Humboldt County, Cal., about May 4th, 1880, and Agency for this paper has been revoked for good and sufficient reasons. Mr. C. is a heavy set man, of dark complexion, weighing some 175 pounds, or more.

Chew Jackson's Best Sweet Navy Tobacco.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,

SAN FRANCISCO, CAL., OCTOBER 9, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Thirty-six (35), of Fifty (50) Cents per share, was declared, payable on Friday, October Fifteenth (15), 1880. Transfer books closed on Tuesday, October Twelfth (12), 1880, at 3 o'clock P. M. WM. WILLIS, Secretary.
Office—Room 29, Nevada Block, No. 309 Montgomery

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company.

Nevada Block, Room 87, San Francisco, October Fifteenth (15), 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 60) of Fifty (50) Cents per share was declared payable on Wednesday, the Twentieth (20) day of October, 1880. Transfer books closed until the Twenty-first (21) instant.

W. W. TRAYLOR, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

San Francisco, October 5, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 10) of Twenty (25) Fiva cents per share was declared, payable on Friday, October Fifteenth (15), 1880, at the office of the Company, room No. 4, 315 California Street, San Francisco, California. Transfer books will be closed from Tuesday, October (12) Twelfth, 1880, until Saturday, October (10) Sixteenth, 1880.

JOSEPH NASH, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,

SAN FRANCISCO, OCTOBER 2, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. (20) Twenty of Seventy (75) Fiva Cents per share was declared, payable on Tuesday, October (12) Twelfth, 1880, at the office in this city, or at the Agency of The Nevada Bank of San Francisco in New York.

WM. WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

Techattucup Silver and Gold Mining Co.—

Location of principal place of business, San Francisco, Cal. Location of works, El Dorado Canyon, Lincoln County, Nevada.

NOTICE—There is delinquent upon the following described stock, on account of assessment (No 7), levied on the 24th day of August, 1880, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. of Certificate.	No. Shares.	Amt.
Avery, Benj P.	101	100	\$ 100 00
Barrows, Henry D.	230	50	50 00
Cutler, Sam'l M.	200	100	100 00
Corbett, Miles S.	190	36	36 00
Cole, Lewis N.	135	100	100 00
Cole, Lewis N.	136	50	50 00
Cole, Lewis N.	137	50	50 00
Cole, Lewis N.	138	50	50 00
Cole, Lewis N.	139	50	50 00
Cole, Lewis N.	140	50	50 00
Cole, Lewis N.	141	50	50 00
Cole, Lewis N.	142	50	50 00
Cole, Lewis N.	143	50	50 00
Cole, Lewis N.	144	50	50 00
Cole, Lewis N.	145	50	50 00
Cole, Lewis N.	146	25	25 00
Childs, W. W.	127	100	100 00
Caley, Wm.	221	200	200 00
Caley, Wm.	221	100	100 00
Culdea, M. W.	17	100	100 00
Dockweller, Henry.	97	20	30 00
Dockweller, M.	15	100	100 00
Foster, David.	203	54	54 00
Foster, David.	207	200	200 00
Dockweller, Henry.	231	120	120 00
Ortiz, Sarah A.	247	20	30 00
Hobbs, H. H.	240	1000	1000 00
Hobbs, H. H.	241	1000	1000 00
Hobbs, H. H.	249	500	500 00
Hoyes, R. F.	238	500	500 00
Huber, Wm H.	218	50	50 00
Hoyt, Mrs H.	100	100	100 00
Hoyt, Albert.	165	50	50 00
Hoyt, A. Bert.	183	100	100 00
Hoyt, Mary E.	123	70	70 00
Hoyt, Mary E.	138	50	50 00
Hoyt, Mary E.	170	50	50 00
Hoyt, Mary E.	225	925	925 00
Hoyt, Mary E.	228	500	500 00
Hall, John H.	208	72	72 00
McGuo, Robert K.	207	54	54 00
McKeeby, L. O.	243	300	300 00
Nelson, James.	08	200	200 00
Pray, Amos.	250	500	500 00
Kubottom, Wm W.	153	50	50 00
Thomas, Chas W.	91	100	100 00
Troyon, E. B.	251	200	200 00
Urmlston, David.	204	13	13 00
Vineyard, J. R.	23	250	250 00
Vineyard, J. R.	24	250	250 00
Vineyard, J. R.	25	250	250 00
Vineyard, J. R.	26	250	250 00
Whitcomb, A. O.	62	100	100 00
Whitcomb, A. O.	63	137	137 50
Whitcomb, A. O.	173	2	2 00
Workman, Nancy.	18	275	275 00

And in accordance with law, and order of the Board of Trustees, made on the 24th day of August, 1880, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, No. 237 First St., San Francisco, Cal., on Wednesday, the 20th day of October, 1880, at the hour of one o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

C. F. MOULTHROP, Secretary.

Office—No. 237 First St., San Francisco, Cal.

Lewis Consolidated Silver Mining Company

Location of principal place of business, San Francisco. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2d) day of October, 1880, an assessment, No. Three (3), of Ten (10) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 15, No. 310 Pine Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the first (1st) day of December, 1880, will be delinquent, and advertised for sale at public auction; and unless payment be made before, will be sold on Monday, the (20th) Twentieth day of December, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Secretary.

Office—No. 310 Pine Street, Room 15, San Francisco, Cal.



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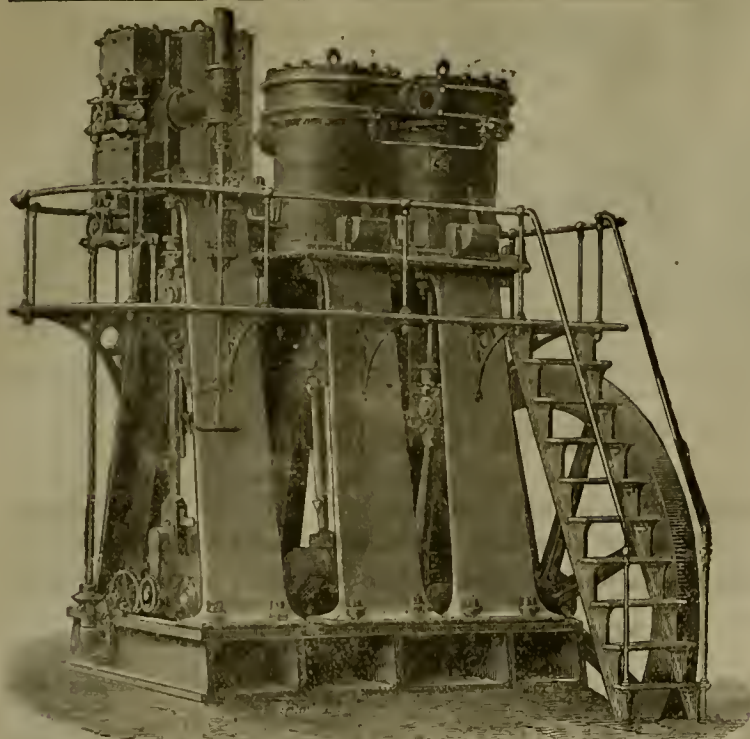
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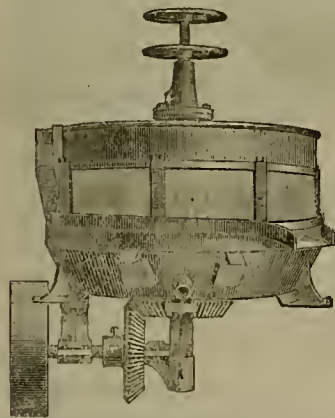
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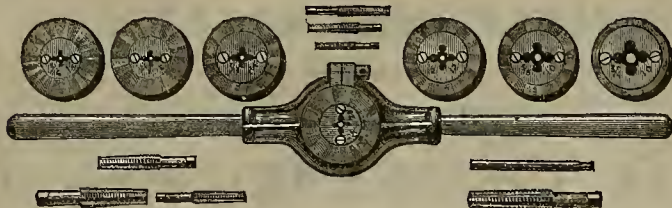
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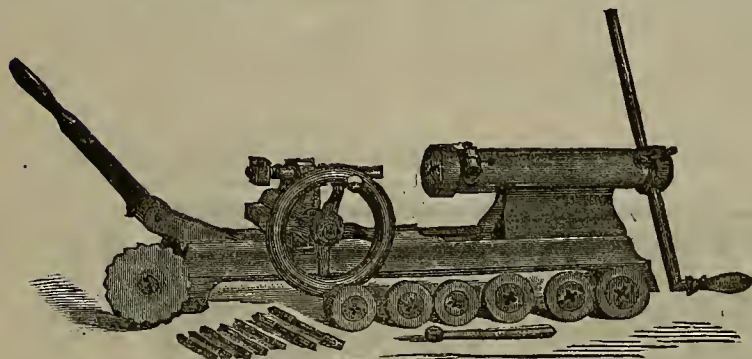
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D, " 53 " " 6 " " " $\frac{3}{4}$ to 1 $\frac{1}{2}$ "

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It is printed on fine paper and has nearly 100 pages. 7 1/2 x 5 inches. Price only 25 cents, or 5 for \$1, on receipt of which we will send by mail to any address.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 23, 1880.

VOLUME XLII
Number 17.

Assayers' Materials.

John Taylor & Co., of this city, importers and dealers in assayers' materials, mine and mill supplies and chemicals, have just issued a price list of assayers' articles, for the convenience of persons in the mining districts. It is by far the most complete list published for practical workers,—assayers, mine and mill owners. Some catalogues have been printed previously in the East, but they are more particularly for colleges. This has not been done before to any such extent by anyone, with the wants of the mining community particularly in view.

This firm was established in 1852, and from long experience and peculiar advantages are perfectly familiar with the wants of the mining public. They can also offer greater inducements than Eastern dealers, no one of whom has so large and full varieties of the right kind of goods for purchasers in our large mining fields.

They have very sensibly attached prices to nearly all the articles required by an assayer, and the cost of an outfit can be estimated very nearly. All articles are purchased as low as they can be had in the market. The French, German and English crucibles are imported direct by sail vessels, and from the largest manufacturers. And it may be said, in general, that the mining interests, in their various forms, having been the leading interests in California and the other Pacific Coast States and Territories for many years, it is believed that all the articles required in connection with the mines, including machinery of all kinds, chemicals and incidental supplies, can, on the whole, be obtained to better advantage, and of more satisfactory quality, in San Francisco than elsewhere.

The demand for many of the chemicals and compounds for assayers' use and for reducing ores being, in many cases, for small quantities, the firm keep a full stock on hand put up in convenient sized packages. The firm are the agents for the Battersea works, London, England. Their new and commodious quarters are at Nos. 118 and 120 Market and 15 and 17 California streets. At no other place will he found so full an outfit for miners and assayers. It is really worth a visit to anyone interested in such things, to see the great variety of articles and substances which are here displayed.

DEEP SPRINGS.—The *Inyo Independent*, in speaking of this camp, says: Work is being quietly prosecuted by W. A. Greenly, Scott Broder, Billy Lake, and others, who own claims, their idea being to develop and show up their mines before inviting any more capitalists to come and look at them. These men have perfect confidence in a bright future for Deep Springs, and they are determined to "stay with the works." A shaft has been sunk on the Indian Scout mine 50 ft. deep, which shows a continuous vein of ore all the way down, with three ft. of ore in the bottom; drifting on the vein will soon be commenced from the bottom of this shaft. A shaft is now being sunk on the Greenly claim, which is on the same ledge, and adjoins the Scout; the prospect in this claim is of the same encouraging character as the Scout's; the ores from these two mines are of the same general character, being milling ores carrying both gold and silver. The average assays from a large number made is \$75 to \$80, which includes about \$15 in gold per ton. The Indian Scout is an immense ledge, having some 10 locations on it of 1,500 ft. each, which can be seen the whole distance, and rich ore can be found on the surface on any of these claims. There are a large number of other first class prospects in the district, on some of which work is being prosecuted. The ledges are large and are enclosed in well defined walls. We are satisfied that in a few months more Deep Spring district will show up some mines that will "astonish the natives."

The Ontario mining company paid a dividend of 50¢ per share in N. Y., Saturday. It is said that this makes \$3,000,000 paid to stockholders. Good for Utah.

An Improved Soft Patch Bolt.

This simple improvement in soft patch bolts, as shown in the accompanying cut, consists of two holes drilled in the end of the bolt, so as to form an eye for the insertion of a copper connecting hook by which the bolt is fastened to the wire or string that passes through the hole where the bolt is to be placed. After the bolt is drawn into position, the wire or string is removed from the hook and the nut put on. The workman, by means of this connecting hook, has full control of the bolt, so as to keep it from turning or dropping out of place. The hook can be removed from the bolt by simply bending the end a little to one side. This device is protected by these patents. The following are some of the advantages secured by using the improved soft patch bolt: Saving of time; facility in the attachment and removal of the



ELLIOTT'S IMPROVED LACE CUTTER.

wire; reduced size of bolt holes; security against loss of bolts, as they can neither slip from the wire nor drop through the hole; full control of the bolt until the nut is screwed up; ease of entrance by reason of the pull on the bolt being central; frequency with which the same connecting hook can be used.

In offering this bolt to the trade on this coast, Messrs. Dunham, Carrigan & Co. feel confident that they are presenting a long-needed article, and one that only needs to be seen to be appreciated by engineers, hoiler makers and others. These bolts are made of best refined iron, and are first-class in every respect. The copper connecting hook, as shown in the cut, is



HALL'S IMPROVED SOFT PATCH BOLT.

so simple in construction as to obviate the necessity of furnishing it except with samples.

BROOKLYN MINE.—The *Belmont Courier* notes that the Brooklyn is one of the most promising, and so far has proven the most productive new mine ever developed in that county. The incline is down about 140 ft., the bottom being north of the ledge. The owners will crosscut to intersect it at this depth as soon as the hoisting works are ready. A drift, however, to the west of only a few ft., at a depth of 35 ft. from the base of the mountain, where the incline commences, has just developed an immense chamber of ore, at present of unknown dimensions. The ore is remarkably uniform in its character, and will assay about \$100 per ton. A large quantity is already on the dump on which the Alexander mill will shortly make a run. The product will be all "sugar" for the owners, the mine having more than paid expenses from the start, and you will soon see it in the front rank.

To a man traveling from Mason valley to Candelaria, says the Candelaria (Nev.) *True Fissure*, it seems that every man along the road owns a quartz mine or has good prospects for one. Even out in the middle of the deserts one will occasionally see location notices tacked to rude posts, announcing the existence of mining claims.

California Mining Machinery for Japan.

The *City of Peking*, which sailed this week for Japan, had among her freight a large quantity of mining machinery manufactured at the Pacific Iron Works in this city, and consigned to the Japanese government for use in the mines of Japan. This machinery was an addition to a mill already running there, consisting of a battery, pans, settlers, retorts, shafting, etc., altogether about 100 tons, making a complete 20-stamp mill. The order was from the government direct. The same foundry sent also to Japan a few years ago a plant for a rolling mill, which we understand is in successful operation, in connection with an iron blast furnace.

The first mill, sent by the Pacific Works some eight years ago, they speak very highly of, and claim to be getting excellent results with

Mining Camp "Booms."

A very general tendency is apparent in new mining camps to give them a "boom" right off, before there is anything to "boom" on. At the same time there is not a doubt but that the manufactured "boom" does more harm than good. It is time to blow the trumpets and wave the flags when the procession is in sight. But if all the excitement is over before it gets round the corner it doesn't look as well as it might, and somehow it is disappointing even to the most enthusiastic.

"Booming" a camp prematurely is just like building a big mill before the mine is opened. The mill looks first rate; sounds well in the papers to have its starting up announced, and it makes a good deal more noise running without ore under the stamps than it does when the batteries are well fed. But it doesn't pay. Without ore the mill lies idle. People look at the machinery and say the mine can't amount to anything if it don't furnish ore to its own mill. They don't think of the lack of judgment that led the company to buy the plant. They only see the bad results. The excitement about the mill is over for it is built, and if, at last, it does get to work they say "it is about time for something to be done."

It is just about the same way with mining camps. If people will get up an excitement, and bring their camp before the eyes of the world before it is worth seeing, they must expect lack of enthusiasm when it becomes worth seeing. People would rather see a little more than they expect than less. They would rather throw away \$10 than get swindled out of 10 cents. They don't like being caught with chaff. If a practical mining agent goes to a camp and finds only a dozen or so holes 25 or 30 ft. deep, called shafts, he can't be expected to return and report to the capitalist that the place is a first-class one. These kind of "mines" prove very little. The owners cannot sell them for prices up in the thousands.

It is best to get a new camp into some kind of shape before starting its "boom." Many a one has dropped out of sight altogether by premature publicity. It is hard to get people back again when they have once left, and left with bad impressions. No temporary excitement is healthy, but permanent improvements speak for themselves. Many a district now languishing for want of proper support from capital, owes its ill fate to the injudicious booming it received at the outset.

A Convenient Lace Cutter.

Since the universal adoption of helting as a means of transmitting power, no little attention has been paid to devising means of uniting the two extreme ends of a belt, in a manner both efficient and easy of application. Perhaps the first thing ever used for this purpose was a thong or lacing cut from thin tough leather, and passed alternately through holes punched in either end of the belt, very much after the fashion of lacing a shoe, from which the idea was probably taken.

Judging from the amount of lace leather annually made, it would seem that the method of lacing helts was by no means the least popular. The disadvantages of cutting these lacings with a knife are so great that many consumers prefer to buy "cut lacings," notwithstanding the fact that they are seldom just what is wanted.

This objection is fully obviated by the use of the little tool shown in our engraving, which cuts and points lacings of any length or width as wanted, and without loss of time or leather.

The construction of this lace cutter will be understood from the engraving. It is a practical and well made tool, the result of a long experience in the manufacture of tools of this class by the inventor, who was the first to place a lace cutter upon the market. Sent by mail on receipt of 50 cents. For sale by Dunham, Carrigan & Co., San Francisco.

LAST week the California mine produced 1,214 tons ore, assaying \$22.15 a ton, and the Consolidated Virginia 1,203 tons, assaying \$21.10 per ton.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EWS

Tombstone, Arizona.

EDITORS PRESS:—Mineralogists, geologists and experts generally, are at sea when they first arrive in Arizona. The country has to be studied to be understood. It is unlike any and all countries where minerals have been found in quantities. The idea of ledges and true fissure veins must be rooted out of the expert's mind before he can properly estimate a mine in Arizona. There is no such thing as a fissure vein here. There are ledges and lobes; they are loog and deep, but they are not pinched up between two solid formations. Occasionally granite or porphyry comes in and squeezes a ledge of ore into a narrow compass and forms what appears to be a fissure vein, but when it is followed 10, 20 or 50 ft. the walls disappear and an inexhaustible body of ore is opened. This has been the case in every mine that has been opened in this district. Some have struck the ore near the surface and others have had to sink over 300 ft. before they found it, and when once found it never gives out, and none have failed to find it who have persevered. Many claims have been located with not even a float in sight and have found immense ledges of rich ore by sinking 100 ft. There is a vein of mineral, if vein it may be called, which is easily traced for a distance of 30 miles long by 1½ to 2 miles wide. Its course is northeast and southwest. It runs from the Huachuca mountains through Tombstone to the Dragon mountains. Its course is straight and well-defined. Anywhere and everywhere that shafts have been sunk to any depth on this belt rich ore has been found. It is true some rich ledges have been found outside this belt, but they are only spurs or limbs running out from the great trunk. The character of ore, however, in these side veins is quite different to that found on the main belt. It shows a darker color and more iron, while on the main belt it is carbonate and chloride, dark brown and yellow color.

In confirmation of what I have said, everyone familiar with the ground knows that, starting at the town of Tombstone and crossing the ridge in a S. W. course towards Charleston, for a distance of 10 miles the belt can be easily traced to the valley of the San Pedro, and its width extends from the old Bronkaw on the west to the Bradshaw mine on the east. We do not mean to convey the idea that these mines form the extreme boundaries, for they are not quite one mile apart. But scores of mines have been found between these, and but very few outside. Keeping a straight direction on to the Huachuca's on the foothills, many miles this side of the main range, it crops out again and continues across the mountain range. So, on the other hand, this mineral belt has been traced six miles northeast towards the Dragon range. Then, crossing the deep depression of the valley, it crops out again on the foothills of that range and runs through that range. On one of the high ridges of the Dragon's is situated the celebrated Mary A. mine, now acknowledged to be one of the largest and richest deposits of ore in the Territory. Immediately in the vicinity of this mine numerous others have been discovered, all rich and developing into splendid properties.

I have not examined personally the country beyond these points, but, in conversation with a geologist who recently examined the country as far as Stein's peak, 80 miles northeast, he informed me that the vein or belt cropped out in every range of hills between the Dragon's and the peak, and that many valuable mines had been discovered and are now being developed, some of them near the peak in Granite pass. How much farther it runs civilized humanity has not determined.

QUARTZ.
P. S.—Since writing the above we met an old friend of the late Prof. Davis, who informs me that the professor spent a long time examining the mineral deposit of this district, and that he advanced precisely the same theory as the above.

NEW MINES.—Says the Bodie News: About six weeks ago an old prospector ascended the high ridge constituting the divide between the East Fork of the Walker river and Sweetwater, and there he discovered an immense silver ledge which looks like the first south croppings of the Comstock. Since this discovery a number of prospectors have visited the new district—which is about eight miles from Henry William's ranch—and a great many claims have been located. The assays are of such a nature as to induce the belief that the new discovery is one of the most important made in this part of the country for many years.

DISCOVERY OF A NEW GOLD-FIELD IN AUSTRIA.—Great excitement has been caused throughout Austria by the discovery of the Temora gold-field, near Sydney. The rush of people into the township, says the Sydney Morning Herald, increases daily, men arriving even from Victoria. The great drawback to the development of the field is want of water for puddling purposes. Gold is being struck very freely. Pegging out and sinking are rapidly going on, and bark huts and tents are springing up everywhere along the road.

Northern Sierra Mines.

Encouraging Prospects of Gravel Mines.

From a very extended review of hydraulic mining operations in Sierra county, published in the *Mountain Messenger*, we take the following: Never in the history of mining in northern Sierra, has a season been more prosperous for our drift and hydraulic mines than that of 1880. During our recent hurried trip through the old camps, not a single dissatisfied miner did we meet. All were joyous over their rich foraging raids, and sanguine that the future is bright with promise of still larger golden harvests. As convincing proof that there is substantial foundation for this belief, are the total shipments made by the Bank of La Porte, of gold dust and bullion for 18 years previous to 1873, equal in value to \$60,000,000. Four companies at Howland Flat and Potosi, Down East, Union, Hawkeye and Pittsburg, realized from 2,365,000 square ft. of bedrock \$2,251,653.95, pay gravel being estimated at four and a half ft. in thickness, an average of 95 cents per square ft., or \$5.70 a cubic yard of gravel washed. The material was mined and washed at a cost of 47 cents a square foot, leaving a profit of 48 cents. These estimates do not include the heavy yields of many very rich diggings whose returns could never be traced. Attracted by the favorable inducements thus held out to them, capitalists from the leading money-centers abroad are already anxiously seeking judicious investments for their surplus funds, as is evidenced by the recent honing of numerous lucrative mines from the rich gold leads of La Porte through Gibsonville to Howland Flat, St. Louis and the broad acres of valuable hydraulic claims in and around the somewhat isolated but productive mineral region of Morristown. All this augurs well for the hardy sons of toil to whom Sierra is indebted for the greatest measure of her success as the hanner mining county of the State.

La Porte.

This old mining camp has some of the richest and most extensively worked hydraulic mines on the coast, which have added thousands and thousands—near into millions of dollars to the world's store of gold; and still there is no cessation of the golden shower. Extensive preparations, complete in every detail, are being made for a vigorous campaign next season, which promises to eclipse that of many a previous year since the days of old, and the day of gold, and the days of '49.

Gibsonville.

As a rich mining center, this section of Northern Sierra has held its own against heavy odds remarkably well, and will probably continue to do so for the next decade. The proof of this is clearly indicated by the unmistakable geological evidences on almost every side. The entire ridge of miles in extent between Gibsonville and La Porte is believed to contain as rich a gravel channel as was ever our noted prolific Bald Mountain. Such is this confidence that all of the territory in that direction has been marked out and located; and as soon as practicable, tunnels will pierce the mountains from most every point of the compass, to ascertain the truth or falsity of this theory. The

Union

Has suspended operations, except as regards its main tunnel, which is being driven into the back channel, 700 ft., by a double shift of four hands. The

Michigan

Is running for the same point, and takes out some pay, employing 12 men. The

Gravel Hill

Hydraulic mining company has just finished its clean-up, with "satisfactory" returns. Your old ex-stable man, Ike Thatcher, has charge of a gang of men repairing ditches and sinking cuts preparatory for next season. The corporation is—Geo. Cox, W. F. Lang and F. A. Gourley, three of the most successful and experienced miners in the State.

E. Squier & Sons

Are working from 12 to 15 men, and take out very good pay with prospects of soon doing much better.

H. Tabor

Is repairing his tunnel, now in 2,000 ft., and contemplates pushing vigorously ahead for the back channel this fall and winter.

Mines Bonded.

The Go Ahead and Gibsonville Consolidated ground between Gibsonville and La Porte, has been bonded to H. Wallis and Jas. McGregor, of Forest City.

Newark.

The mines around here are not very active just now, but the prospect is very cheering of a general revival in this section ere many months have rolled around. At Hepsidam, a short distance above, the

North America

Has done a good season's work, with fair dividends. From 40 to 50 men are employed. The upper tunnel is being run for the back channel. The lower tunnel is also being worked, was finished about a month ago. The

Pilot Peak

Gravel claim, amongst the most promising mines in this part of the county, would be a most desirable investment for capitalists, and could be purchased at a fair price and worked advantageously with good interest on the sum

Sears Union Water Co.

Has had a very good clean-up this season. Our accommodating and genial hydraulic friend, Mr. Cox, dazzled our eyes with a "sight" at about 100 lbs. of bullion. Many large shipments have been already made, and more are under way. The boys are still engaged in pounding out the gold, and also are busy scouring out the balance of their gold harvest in their claims, previous to putting them in order for another year's run.

H. H. Crittenden & Co.

Are flush with golden ducats this year from the usual heavy yield of their hydraulic mines, and are pushing through a new tunnel for the more thorough development of the same. The

Bonanza

Gravel claim, at Potosi, above Howland Flat, is bonded for \$225,000, and will probably be sold this fall. The gravel in some of the breasts is so rich with gold that it can easily be picked out with the aid of a miner's candle-stick, by the handful. In company with the foreman (and one-third owner of the mine) Alex. McNeel, we explored the gangways and breasts, and he generously allowed us the privilege of retaining enough of the gold we found for a bonanza ring, a lucky windfall sure enough for a printer, and one to which he does not fall heir to more than once in an ordinary lifetime. Mr. McNeel is one of the oldest settlers of this county, and thoroughly understands the science of mining. The Bonanza tunnel is about 4,000 ft. in length, and the atmosphere through, owing to the air shaft, clear and bracing. Alex. declared that he was "pressing her for all she was worth," and if he don't bring her to time, the company had better close down the mine. Altitude of Bonanza lead, 5,850 ft. above sea level.

Poker Flat,

Way down in the deep, precipitous canyon, where in early days over 3,000 hardy, adventurous miners attended a circus, still has a large gold reserve, though rather securely hidden in the fastnesses of her mountains.

Fred Brockerman

Has made heavy shipments below from his rich hydraulic mine, and Carr's hydraulic and bank claim, east branch of Canyon creek, is paying well.

Kendal & Co.'s.

Hydraulic ground, Little Grizzly, have succeeded this year far beyond their most sanguine expectations. C. R. Scott has done as well as usual this season, and has our best wishes for a lucky find at no distant day in his gold range.

St. Louis

Has her full share of the gold leads, and the mining interests here were never more thriving.

Morgan & Donahue

Are reported to have taken \$115,000 worth of bullion out of their hydraulic diggings this year.

Brundrige & Welmer's

Drift claim has a large amount of gravel in the dump which will be washed in the course of a month; and is expected to yield, as heretofore, "satisfactory" returns.

Brundrige & Conlan

Commenced work recently on their drift claim, and are breasting their back ground. The gravel is rich with gold, and no sardine of a bonanza, judging by the healthy-looking nuggets so often found.

Morristown,

With its hundreds upon hundreds of acres of productive deep gravel banks, has a record that cannot be equaled or excelled by any mining camp in the State. For miles and miles all the ground has been located and bought up until it is now about all concentrated in the hands of a few experienced and energetic miners by whom it has been most successfully worked for many years past. They are associated in what is known as the

American Hydraulic Company,

Whose revenues this season have indeed been princely. A bargain is nearly consummated for the sale of these rich diggings to New York capitalists. There was about three months' water season this year. Usually it lasts for about double that time. Richer ground found this season than for years. Fifty-seven men were employed washing down six claims 100 ft. square, averaging each \$8,000; \$165,000 was taken out of this mine one season. About 10 years ago, working bottom, \$1,500 was realized in 24 hours. One partner sold out his one-tenth interest a few years ago for \$45,000. Fifteen hundred inches of water are used in piping season. Outward indications go to show that this rich gravel range extends up to Deadwood and Big Grizzly. The most wonderful feature about this mine is that it has never needed any assessments, having paid dividends from the start. The gross yield for the past 28 years since '52 has been over \$7,000,000, during which time but 200 acres were worked, and half of that at Craig's Flat. Early in the period of its development, 2,000 ft. of deep bedrock tunnel, for tailing purposes, was run at an expense of \$67,000. There are 1,340 acres yet undeveloped, 12,000 ft. long by 6,000 ft. in width. This summer \$16,000 was washed out of one small tract of ground with only \$5,000 expense. When the New York company begin operations, a new ditch six ft. wide and three ft. deep will be constructed from Canyon creek and the two Grizzly canyons, and extended onward to Craig's Flat. A store and boarding-house is to be erected,

the year. Drifting will be prosecuted during this winter months. It is estimated that fully 100 men will be needed, which desirable addition to the somewhat sparse population of Morristown will transform that now rather slow-going town into one of the liveliest and most prosperous mining camps in California. One hundred ounces was an ordinary day's yield in early times at Craig's Flat.

The Washoe Placer.

Orndorff & Co. are still engaged exploring the old river channel in the foothills of the Sierra Nevada mountains, west of Washoe lake. The channel of the ancient river appears to have been a deep chasm cut through the solid granite of the hills at right angles to their course. The sides of this chasm are in the form of terraces. The shaft of the company was sunk vertically to a depth of 100 ft. through gravel, when there was reached what was at first thought to be a huge granite boulder. From a little crevice in this rock was taken smooth, washed gold in rather coarse pieces to the value of \$5. The shaft was then sunk a further distance of 18 ft., when it became evident that what had been thought a boulder was bedrock.

A drift was started on this rock and run horizontally a distance of 20 ft., the bottom of the shaft (18 ft.) being filled up with dirt from the drift. After the drift has been run 20 ft. on a level the rock suddenly broke off and for 9 ft. it went down perpendicularly. Then the rock went off at an angle of about 50°, and at last accounts was still going at this pitch, having been followed down 34 ft. These terraces are water-worn and in places as smooth as glass. How far the bedrock will keep its present angle no one can tell. It is liable at any time to again either become vertical or to run off on a level. Orndorff & Co. are determined to follow up this rock and find the bottom of this mysterious channel. In 1861-62 a Carson City company undertook to prospect this channel. They got down among these same terraces, and soon had so many drifts and vertical shafts of various lengths and depths that they gave up the enterprise in disgust. The Carson men, however, started their first shaft but a short distance from the edge of the channel. By going out further, and making their first shaft 100 ft. deep, the present company no doubt escaped several of the terraces that bothered the Carson folks, yet they are beginning to find themselves working at a great disadvantage. They must now bring all the dirt extracted up a steep slope a distance of 34 ft.; it must then be hoisted vertically 9 ft., when it must be wheeled on a level 20 ft. and finally hoisted 100 ft. to the surface through the main vertical shaft. All who know the place are quite confident that at the bottom of the channel, if it can ever be reached, will be found "bushels of gold." The reason for this belief is that in 1861 a small overflow from the ancient channel was found which was immensely rich in coarse gold. Although the gold was only found in one place—a short and shallow ravine that headed at the edge of the ancient channel—yet during the mining of it quite a lively little town was built up. There was a hotel, meat market, saloon and shops of various kinds. The stream of golden nuggets was followed up until it dipped into the hill, and till this day nothing more has been seen of it except the \$4 in dust found at the bottom of the vertical shaft of the present company.—*Virginia Enterprise*.

Johnson's Gulch.

This not euphonious name was given at some period in the past to a beautiful pass between the Red and Wet mountains, which onto the chain about one mile north of Bassick mine. At one place north of, and near Tyndall mountain, this pass widens out and becomes a park, through which a limpid brook, fed by springs, threads its way. Two years before silver was discovered at Silver Cliff all of this park was staked as placer claims, but was deserted and apparently forgotten in the wild rush hither when the Racine Boy was discovered. On the hills which form the southwestern wall of this pass, Mr. E. J. Haskell, of Rockford, Illinois, with W. J. Bradley and Abe Thompson—two old California miners—found the outcropping of a vein of hematite, which they traced from Herring to Tyndall mountain, a distance of about one and a quarter miles. On this vein they have located the Winneago Chief, the Golden Eagle, American Eagle, American Flag, Iron King, Iron Queen and Gray Eagle claims, all of which they are working, aided by interested parties of means who are now residents. They are doing their work with a quiet determination which wins in the long run, and though but little depth is gained at any one spot, the value of the vein is so apparent that we feel safe in saying the group of claims laid along it will be known as one of the richest in the district. It is the earnest, persistent labor of such men as Haskell, Bradley and Thompson on which we must rely to lay broad and deep the foundations of the future city of Silver Cliff.—*Silver Cliff Prospect*.

ENGLAND has 2,930,000 operatives, whose average annual products are £224; Germany, 2,781,000, who produce annually, each, £103 in value; France, 1,936,000, whose annual products average £220 each. The value of the textile products produced in the United Kingdom is £155,000,000; United States, \$420,000,000; Austria, 1,340,000, who produce annually, each, £103 in value.

MECHANICAL PROGRESS.

The Piedboef Boiler.

This boiler, which has been brought out in Germany and has been exhibited recently at the Dusseldorf exhibition, consists essentially of two cylinders, one above the other, in both of which there is a steam space, instead of the upper one only. The lower cylinder is in this case an ordinary Cornish boiler, with internal furnace exactly as usual. At its back end it is freely connected, by a short pipe of large diameter, with an upper cylinder not quite so long as itself, through which pass, from end to end, a number of ordinary boiler tubes. Inside the Cornish boiler, just in front of the vertical connecting pipe, is fixed a diaphragm plate, extending downward from the top of the shell about eight inches, and so coming within four inches of the furnace top. The upper space in front of this diaphragm plate is connected with the steam space of the top cylinder by a pipe having in it a plain single heat valve opening freely upward. As a matter of precaution this valve is connected with a float on the lower cylinder, which opens it as steam is formed and the water level lowered, but this is not an essential part of the system. By this arrangement, as can readily be seen, it is possible to have steam in both the lower and upper cylinders. As it is formed in the lower one it passes quietly off through the stand pipes into the upper steam space, there being always a certain unbalanced head of water in the back part of the boiler (where the two cylinders are connected), to insure the right motion of the steam. The gases are carried up from the back of the Cornish boiler and pass to the front through the tubes of the upper cylinder and then back again in the space surrounding the shells, so that there is apparently no danger of the shells being externally burnt. This arrangement also makes the danger of accident from low water a very small one, as the furnace itself cannot be uncovered unless the water level actually falls about seven ft., the water entirely leaving the upper cylinder, which could hardly happen without notice. The boiler has a total heating surface of 1,570 square ft., of which 1,100 square ft. is internal surface and 33.3 square ft. of grate, the ratio of total surface to grate being therefore 47 to 1. It has been used for supplying steam for an engine under trial working at 100 effective horse power and was working nominally at six atmospheres.

Rust-Proof Iron.

Mr. George Bower has invented, and his son has improved a process for coating iron with an indestructible surface of magnetic oxide, which is said not to be open to the objections to the Barff process.

The Bower process, which is not secret, consists in heating the articles to be coated in a closed chamber by means of carbonic oxide, heated air being made to enter the chamber for the double purpose of burning the gas and for combining with the iron. The excess of air, after burning the carbonic oxide gas, combines with the iron, forming first the magnetic oxide, and then the hydrated sesquioxide, or common iron rust. By shutting off the supply of air until only enough is admitted to burn the carbonic oxide, the rust is converted into the magnetic oxide. The process is repeated until the film is sufficiently thick for the purpose of protection. When complete the film has a beautiful French gray tint.

The London Times states that the application of this invention has been undertaken on a large scale, the chamber where the oxidation is now carried on being large enough to contain about a ton of miscellaneous articles. The value of the invention, and of the method of applying it, is no longer a matter of doubt, the severest tests having been made of the iron coated. The earliest experiments only produced a film that would peel from the metal; but by the new method a coating is made which is inseparable from the metal. Inasmuch as the cost of oxidation is less than that of a coat of paint, it has become evident that the next generation, at least, may be happy with cheap and indestructible iron.

ANNEALING STEEL.—There is much carelessness in annealing steel articles which are to be wrought, and much trouble occurs from not properly softening steel before it is given to the bench workmen, the lathe man, or the planer. There is little of true cast steel that has any life in it that can be properly annealed by a heating in a forge fire, taking it out and holding it in the shadow and then plunging it in water when it ceases to glow. It is poor steel that will not contract hardness when thus treated. When it is considered that a spring temper is so low that the amount of heat by Fahrenheit will give 579°, and that this heat will show no glow in the shade, it will be seen that this method of water annealing is not reliable. When a piece to be annealed has been heated to a red it should not be exposed to the air a moment, but be plunged into a bed of fine cinders, air-slaked lime, or charcoal powder. The last is the best, and a dry bath of mingled lime and charcoal particles gives excellent results. There the piece should be left until entirely cold, or until the hand can bear its heat, and even then it is not best to cool it in water.—*Boston Journal of Commerce.*

MARINE ENGINE ECONOMIES.—Prof. John Gamgee has written a letter to Senator Blaine, in which he ventures some statements respecting steam-engine economies at sea, which will be read with interest. He says: "The time has arrived for superseding the wasteful engine, which utilizes about 5% of the coal burned in the boilers. Improved methods of engine construction and a correct knowledge of the laws of heat enable us to adopt a new system, in which high pressures are secured at low temperatures, approaching much more than the steam engine to the animal mechanism, which develops motion and unlimited horse-power below blood heat." In referring to the capability of engineers in this country who have developed this theory, he concludes the communication as follows: "Engine must be made like Waltham watches—entirely by machinery and of uniform excellence. Engines can be designed wasting only 25% instead of 90% of fuel. In short, wooden vessels can be built to cross the ocean at an expense for navigation little, if at all, exceeding the sailing ship, and filled with merchandise instead of coal. They can be driven as fast as by steam, enduring longer than metal ships, and affording at least equal chances for comfort and safety." It is very easy to write this kind of thing, but while the time has come for this kind of ships, the ships are still coming, and it would be difficult to say how soon they will arrive.

INCREASE OF MOMENTUM WITH INCREASED

SPEED OF RAILWAY TRAINS.—Some recent experiments with train brakes in England have afforded a new and practical exemplification of the laws of momentum as applied to the stopping of trains—laws which seem to be too often forgotten, under circumstances when forgetfulness may lead to some serious accidents. During the trials the Westinghouse brake stopped a train moving at the rate of 41.5 miles an hour at a point only 455 ft. distant from the place where the brake was applied, but when the speed was increased to 61 miles per hour, the distance run after the application of the brake was 1,185 ft.; and when the speed of the train was increased to 67 miles per hour, the distance traveled was 2,055 ft. This result was not confined to the working of the Westinghouse brake, as similar results were obtained when other brakes were used. This trial would indicate that 50% increase on the initial velocity of 41.5 miles would require an increase of 148% in the stopping distance, or 3 to 1. An additional increase of 10% demands an increase of 73% in stopping time, or 7 to 1; or, as compared with the original figures, an increase of 61% in speed demands an increase of 343% in stopping time. This is a danger signal that should be heeded.—*Iron Age.*

INFLUENCE OF LIGHT, COPSE AND MOLD ON FOREST GROWTH.—M. Gurnaud has conducted a series of observations, during the past 19 years, upon the solid contents of annual growth in a forest among the Jura mountains. He finds that: 1. Light, when it strikes the ground without having been sifted by foliage, stimulates the production of carbonic acid in the decompositions which are engendered by the humus, together with a decomposition of the same gas by the chlorophyll. 2. The growth of wood diminishes when the underbrush intercepts, to any great extent, and the access of light to the soil and diminishes its reflex action on the branches of the trees. 3. This interruption of reflex action is due mainly to the spread of the underbrush, for when it is kept trimmed the vertical shoots which are retained interpose no obstacle. 4. The mold, under too great a thickness, loses a part of its virtue, and, like barnyard manure which is too deeply buried, remains inert for many years.—*Comptes Rendus.*

AN IMPROVED PROPELLER.—An invention which is attracting considerable attention among shipbuilders in England is the De Bay propeller, which, there is every ground for believing, will considerably reduce the enormous waste of power of the screw now so generally adopted for the propulsion of steam vessels, although the loss of power is from 40% to 50%. The propeller consists of 2 screws, which are revolved in contrary directions. The 2 screws are mounted on shafts of which the one revolves within the other, the one screw having 3 blades while the other has 4. These are of peculiar shape, being so formed that each blade has projections where the other has depressions. A steamer, the *Cora Maria*, was fitted with the propeller, and it was found that while she steamed 8.73 knots with an ordinary screw, her speed was 11.28 knots, a saving of 29.2%, with practically the same expenditure of power.—*Iron.*

HEAVY MACHINERY.—The St. Chamond Steel Works, France, boasts of having the largest lathe in the world. It was manufactured by Sir Joseph Whitworth & Co., of Manchester, England, and has just been set up in France for turning 100-ton guns. Perhaps the heaviest general plant of machinery in any one workshop in the world is to be seen in the extensive machine shop connected with the Royal Arsenal at Woolwich, England. In this shop there is a planing machine capable of giving a true surface to iron plates 6 ft. wide by 30 ft. in length, also a lathe having a face-plate 9 ft. in diameter, which will turn a mass of iron of any weight which it is practicable to handle.

SCIENTIFIC PROGRESS.

A Novel Mode of Cutting Iron.

Some time since it was announced that Mr. Jacob Reese, of Pittsburg, Pa., had succeeded in cutting iron and steel by simply revolving near it, at high speed, a thin disk of steel. We are now in position to give some additional details and present illustrations of his "fusing disk." The disk is 42 in. in diameter, scant 3-16 of an inch thick, and smooth on its periphery. It is made either of wrought iron or of soft steel, is nicely balanced and runs at a velocity of 25,000 ft. a minute at its periphery. Mr. Reese holds that it is the impact of the particles of air hurled with great velocity against objects held near the periphery of the disk that effects the fusion of steel. A groove is instantly melted into a round bar of steel held before the fusing disk, and the steel drops down in a fused metallic state. When the motion of the disk is stopped, it may be noted that the disk does not touch the bar of steel, there being a space in each side and in front of it. This is proven by the fact that while the disk is only 3-16ths of an inch in thickness, the groove made into the steel is 5-16ths wide, thus showing an air space of 1-16th of an inch on each side and in front of it. When the disk is in proper order, so that it has no lateral movement, the ends of the bar melted through are smooth. It is stated by Mr. Reese that the operation of the fusing disk differs from the "cold saw" so widely used for rails, etc., in one important particular. The dust from the cold saw is thrown away from the latter as an oxide, while the fusing disk melts the metal.

In practice, the round bar to be cut is placed in the chuck and caused to revolve at a rate of 200 revolutions per minute in the same direction as the disk. When the disk is traveling at a velocity equal to 25,000 ft. per minute, the instant the bar is brought near the disk fusion takes place, and as the bar is turned by the chuck, a gutter is melted around it, and as it is fed nearer to the disk, the gutter is deepened until the bar is severed. A 2-inch round bar of cast steel has been fused through in 10 sec., and a 1½-inch round bar of cast steel in 7 sec., but in practice such bars require from one to one half minutes to adjust and fuse each section to length. It is stated that the work is done so accurate that hundreds of thousands of gun barrels and revolver chambers have been fused to length and then bored without further dressing. When the rough ends of shafting are fused off by the disk, the ends are ready for centering. A large machine will cut shafting from one to three inches in diameter, while a smaller size has a range of from one-fourth to one and a half inches. The small machine is a very useful one in railroad and other machine shops, as it can be easily operated.—*Iron.*

AN EXTRA-SENSITIVE THERMOMETER.—Prof. Dufour, of Paris, has devised a small thermometric apparatus, which is so sensitive that it will even denote, by a deflection of the index needle of nearly two inches, the entrance of a person in the room where it is placed. By putting the hand near the bulb the needle is deflected the whole extent of the graduated arc. This apparatus, which we find described and illustrated in *La Nature*, consists of a bent tube, carrying at one end a bulb, which is coated externally with lamp-black. The middle of the tube is filled with mercury, and is supported by arms pivoting on a steel knife blade. Just above the pivot is fixed an index needle which moves across a graduated arc. Beneath the pivot hangs a rod, to which is attached by friction a small weight, that serves to balance the needle so as to make it point to zero on the arc. When the temperature rises, he it ever so slightly, the heat, being absorbed by the lamp-black, dilates the air in the bulb, and drives the mercury forward. The center of gravity of the apparatus being displaced, the needle will immediately turn toward the right. When, on the contrary, the temperature decreases the needle will point toward the left. To prevent the instrument tipping over on a sudden and considerable elevation of temperature, two small pins are placed at points beneath the tube. Hooks near the bulb serve to hold substances whose diathermic powers it is desired to ascertain. The heat source is introduced into an aperture in the plate.

SUNLIGHT.—Dr. Carpenter says the entire absence of sunlight on the deep-sea bottom seems to have the same effect as the darkness of caves in reducing to a rudimentary condition the eyes of such of their inhabitants, as fish and crustacea, which ordinarily enjoy visual power, and many of these are provided with enormously long and delicate feelers or hairs, with which they feel their way about, just as a blind man does with his stick.

TRANSPARENT GOLD.—If a solution of gold in aqua regia is centralized by carbonate of soda, and a solution of oxalic acid is added, the gold is precipitated in a brilliant yellow powder. On examining this precipitate by the microscope the flakes are found to have a triangular or hexagonal form and to be translucent, the color of the transmitted light depending on the thickness of the crystals.—*Les Mondes.*

Photographs by Lightning.

Mr. R. Crowe, of Liverpool, communicates to the *British Journal of Photography*, an account of some attempts to photograph a landscape by the aid of lightning flashes. A gelatin plate, requiring by day an exposure of two seconds, was exposed from 10:15 p. m., to 10:45 p. m., during which time there were 120 brilliant flashes and about half as many minor ones. Most of these were in a horizontal direction, and 5 or 6 of them were imprinted on the negative. A perpendicular flash which struck a church tower half a mile away was rendered with extraordinary sharpness and brilliancy. The surrounding objects, in spite of the long exposure were but feebly impressed, whence Mr. Crowe argues that though the light of a flash of lightning is of a very actinic character, there is still not sufficient volume of light to illuminate a landscape or building to allow a successful photograph to be taken. The probable difficulty is that the photo-plates are not sufficiently sensitive. The duration of a lightning flash was found by Wheatstone to be less than a millionth part of a second. We believe there is no record of the successful photographing of any object with a plate exposure of so short a length of time, even in the strongest sunlight.

TO DETERMINE THE HEIGHT AND DISTANCE OF CLOUDS.—Mr. Francis Galton has, in a paper read before the British Association at Swansea, described a method devised by him for determining the height and distance of clouds. The essential principle of this method consists in the employment of two horizontal reflecting surfaces at different levels, the lower being the surface of a still lake, or pond, or cistern, or a large puddle, and the upper being a small mercury trough or artificial horizon. By taking an observation of the cloud as reflected by the two surfaces, and measuring by means of a sextant the angle formed by the reflected ray from each at their point of intersection in the eye, and knowing the vertical height of the observer above the surface of the lake or pool, the whole system becomes a gigantic "station finder," and the height or distance of the cloud may be calculated from its parallax with respect to the vertical distance between the two reflecting surfaces, which then becomes the base line of the observation.

INTERESTING EXPERIMENT.—Signor Agostine finds, says *Nature*, that if through a drop of mercury, lying on a surface not wet by it, a current of electricity be sent in a vertical direction, it rotates under the influence of the earth's magnetism, as may be seen if a few particles of lycopodium powder be strewn on it. Similarly a mercury drop rotates when placed on the surface of a steel magnet, and *e. g.*, the magnet connected with a positive pole of a very weak element, while an electrode penetrating the drop from above is connected with the negative. From the strength and direction of rotation of a number of such drops one may in general make visible the distribution of the magnetic bars themselves, as when an iron bar is brought coaxially near to one end or into contact; also in the latter. The results of previous experimental measurements are thus provided.

DISCOVERY OF A NEW ELEMENTARY BODY IN THE LAVA OF VESUVIUS.—Prof. Scacchi, the celebrated mineralogist and crystallographer, in studying the yellow incrustation which is found on certain portions of the Vesuvian lava ejected in 1631, and which he calls Veshine, has discovered a body which differs in its character from all the known elements. He considers Veshine as a vesiate of alumina, and he regards vesic acid as the oxidized of a new element, *vesium*, which, according to the properties of its compounds, will probably stand between molybdenum and vanadium. Scacchi thinks that veshium may be found in some of the common ores, where its presence has never been suspected because it has been confounded with some of the known acidifiable metals.—*Bull. de l'Acad. Belg.*

NEW DISCOVERIES ON THE NEW ENGLAND COAST.—The United States Fish Commission's steamer *Fish Hawk* has made two dredging trips the past summer along the New England coast. The dredging was done chiefly between 150 fathoms and 325 fathoms, and the yield was immense. More additions were made to the marine fauna of New England than in the previous six years. The discoveries during the two trips were 30 crustaceans and 70 mollusks, more than half of them entirely new; also 33 species of fish, of which 12 are entirely new to science, representing four or more new genera; and 27 were strangers to the fauna of New England.

TESTIMONY OF THE ROCKS.—From a small erratic block, wholly unlike the rock of Mount Washington, found on the summit of that mountain recently, Prof. C. H. Hitchcock infers that the glacial ice was deeper in that region than has hitherto been supposed. The boulder resembles the rocks of Cherry mountain; and if it was carried to Mount Washington by ice, as Prof. Hitchcock believes, Mount Washington must have been totally submerged by the ice sheet at some time during the glacial epoch.

DERBIE MINE.—Nevada City *Transcript*, Oct. 16: The Derby drift mine, of Bloomfield township, is in a prosperous way, and now bids fair to realize the expectations of its most sanguine stockholders. During last month the yield was \$19,400. After paying in enough wood and supplies to last till next spring, all paid for out of that amount, besides running expenses, a snug balance of between \$6,000 and \$7,000 remains. It is reasonably estimated that from this time forth the mine will pay from \$10,000 to \$12,000 per month clear of expenses.

REPAIRING THE EXCELSIOR DITCH.—The annual repairs on

cuted vigorously under the superintendence of Mr. Dike. A portion of the ditch which extends to Newton will be changed so as to run higher on the ridge, and thus give a stronger pressure at the Merrifield mine. The repairs all along the line will be completed in time for the winter.

SAILOR FLAT CLEAN-UP.—Another clean-up has just been made at the Sailor Flat hydraulic mine, and the amount realized was melted into \$3,000 gold bar at the Citizens' bank. The Sailor Flat is owned by practical miners who work in it, and it is about as steady and profitable a producer as any claim of its size in the State.

DITCH REPAIRS COMPLETED.—The repairs along Cascade ditch and at the head of Snow Mountain ditch will be completed to-day. Work on the other branches of the South Yuba company's canals is being pushed ahead rapidly, and everything will be in thorough repair by the time the winter rains begin.

NEW YORK HILL MINE.—Nevada City *Herald*, Oct. 14: The present prospects of the New York Hill mine, which is situated at Grass Valley, are said to be very flattering. It is reported that over \$50,000 has been cleaned up this month, and that the chances are that a larger one will be made this coming one. The stock, it is said, is already worth \$8, and what the value will be in 2 or 3 months is hard to tell, but it has become a regular dividend-paying mine. It is the opinion of many that it will turn out to be the boss mine of the county. D. O. Mills is said to be the largest owner, he having between 7,000 or 8,000 shares.

WORK RESUMED.—Nevada City *Transcript*, Oct. 17: Work has been resumed on the Osceola quartz mine at High and Keady. The old tunnel is being driven ahead, and is now in a distance of nearly 375 ft. A new chute of ore has been recently developed, and it is expected that the mine will be opened up on an extensive scale.

CENTENNIAL MINE.—Grass Valley *Union*, Oct. 19: A clean-up of 60 loads of rock, on Saturday last, from the Centennial mine, gave a yield of \$1,400, or about \$70 per load. The ledge in the mine is looking as well as at any time, being of high grade, and the prospect is bright. The main incline for some time back, and had the ground hard and expensive. In sinking the shaft unusual expense has been incurred, and the Trustees have deemed it best to levy an assessment to pay off an indebtedness for labor which has accrued in consequence. This is only the 2d assessment ever levied by the company, and will amount to \$2,000, which will pay off all indebtedness.

PLACER.

YANKEE HILL MINE.—*Herald*, Oct. 18: The Newcastle gold mining company, 14 miles from Fins, has been making extensive improvements preparatory to their winter run. Last spring the company laid 2 miles of 22-inch iron pipe for conveying water from the Bear River ditch to Yankee Hill with hydraulic pressure. The opening runs were very satisfactory, exposing a fine bank of gravel somewhat cemented in the old channel. In the last 3 months the company has run a bedrock and flume tunnel about 300 ft in length and sufficiently low to work the lowest part of the channel yet discovered. On the 6th of this month they fired 2 blasts, using in one 1,800 lbs, and in the other 15 kegs of powder, and the blasts were very effective, literally shattering the hill from bedrock to surface. The company will commence washing as soon as the present repairs on the Bear River ditch are completed.

PLUMAS.

MINING ITEMS.—Greenview *Bulletin*, Oct. 14: The Plumas Free concentrators, lately put in the mine of the Plumas National company, are completed and will be started up in a few days. In the Green Mountain mine last week the connection was made from tunnel No. 5 with the Blake drift in No. 4. This opens up a splendid body of ore and gives very large reserves, as well as affords increased ventilation in the mine. The new 60-stamp mill is ready to run, and waiting the completion of some work on the tramway, when the mill will be started.

THE MONTE CRISTO.—Plumas *National*, Oct. 16: Within the past two weeks a ditch has been dug, over 2 miles in length, to the Monte Cristo mine, from one of the heads of Buck's creek. The ditch is 12 ft wide and 18 inches deep. Four large reservoirs will be built, 2 at the head of Buck's creek and 2 on Chichamash flat, and it is calculated that they will furnish water sufficient to wash all the gravel that 600 men, working night and day, can drift out. The ditch is completed with the exception of a few rock points which have to be flumed to carry the water. It is almost incredible what an amount of work Mr. Allstrom has performed since his arrival here a few weeks ago. If our county had a few more such "rustlers" as "Russian Hill," it would soon make a different showing, and would have to have an addition of many hundreds of hard-working, industrious miners to take from the rich hills and channels the golden harvest.

SIERRA.

SAVAGE.—Mountain *Messenger*, Oct. 16: We are informed that the Savage placer mining company have resolved to raise up from their tunnel to see what the bedrock looks like above them.

SOL.—The American company's mine, at Morriscourt, has been sold, and the new Superintendent has arrived and taken possession. The ditch will be immediately extended to Craig's flat, and that ground all worked.

CLARK SOLD.—T. J. Hibbert has sold his interest in the mining claim, 4 miles from Bassett's, up Howard creek, to Mr. Cox, of Sierra Buttes. Mr. Hibbert has gone below to Brown's Valley, Yuba county, where his family is.

DITCO.—Morgan & Donohoe are surveying for an extension of their ditch to Oardner's point, to enable Col. Baker to work Orsini Flat. He will work through the Pioneer company's tunnel. The ditch will be 2½ miles in length, and 100 Chinamen are already at work. The water will be piped across Cedar Grove ravine in 2,200 ft of 3-ft pipes. The ditch will carry 3,000 cubics.

THE BALD MOUNTAIN EXTENSION TUNNEL last Thursday morning was in just over 2,000 ft. Bedrock is still very soft and water is now trickling down on the right-hand side of the face of the tunnel. Oravel may be reached at any minute.

NEW MINING COMPANY.—The Black Jack mining and smelting company, whose property is situated in Jim Crow canyon, Sierra county, has reorganized in New York. The capital stock is \$250,000, in shares of \$2.50 each. Trustees—Messrs. C. S. Beuhm, C. P. Pell, O. Oodrey, Jr., J. P. Jones, W. S. Welch, William T. Brown and J. L. Brennan.

TRINITY.

BULLYHOOP SALE.—Trinity *Journal*, Oct. 16: At the Receiver's sale, last Saturday, the Bullyhoop and Occidental quartz mining property was sold to James A. Johnson, of Indian Creek, for the sum of \$5,200, subject to confirmation by the Superior Court.

NEVADA.

WASHOE DISTRICT.—Official Letters, Oct. 19: The dump below the 2150 level is now completed. We are now engaged in opening the station on the 2150 level. When this work is completed a drift will be started east. We are engaged in cutting out a tank-pit below this level preparatory to carrying the pumps down to the lowest workings of the mine.

SIERRA NEVADA.—On the 2300 level upraise No. 1, west drift, has been advanced 16 ft; total length, 181 ft. The west drift from upraise No. 2 has been advanced 12 ft. On the 2400 level the repairs on the station have been completed. On the 2500 level west crosscut No. 1 has been advanced 25 ft; total, 108 ft. Work resumed in the south drift on the 2500 level.

CALIFORNIA.—During the past week 1,242 tons of ore have been extracted from the slopes on the 1650 level of the assay value of \$23.15 per ton. On the 2000 level the joint Ophir winze has been sunk and timbered 14 ft. On the 2300 level the joint Ophir upraise has been extended 15 ft, and the north drift 19 ft.

UNION COX.—On the 2500 level the south drift from the Union shaft has been extended 23 ft. In the south drift from No. 1 winze are cutting down the grade, east crosscut No. 1 has been connected with the south drift from No. 1

winze; east crosscut No. 2 has been extended 30 ft; south drift from upraise has been extended 14 ft, and No. 1 winze has been sunk and timbered 5 ft.

COX VIRGINIA.—During the past week there have been extracted from the 1750 level 1,200 tons of ore of the assay value of \$21.10 per ton.

CON. IMPERIAL.—The east crosscut, 250 ft south of the north winze, 2810 level, is 13 ft 3 in, the face in hard porphyry crossed by small stringers of quartz.

OVERMAN.—Winze has been sunk and timbered 25 ft; total depth, 236 ft below 1900 level; rock harder, but blasts well. Incline upraise has been extended and timbered 27 ft, and is still in hard, dark porphyry.

OPHIR.—On the 2000 level the joint California winze has been sunk and timbered 14 ft. On the 2300 level the joint California upraise has been extended 15 ft. On the 2500 level we are engaged in cutting out a chamber for the joint Mexican winze.

SAYLOR.—During the week the shaft force was engaged in main shaft repairs as usual. The incline force was engaged in repairing head of incline and the drift force continued the driving of the 10th level drift.

MEXICAN.—On the 1600 level we are repairing the north lateral drift. On the 2500 level we are cutting down the grade in the main north lateral drift; also, are cutting out a chamber for the joint Ophir winze.

CALIFORNIA.—Ramps have been run on an average of 18½ hours per day, consuming 7.37 cords of wood per day.

UNION SHAFT.—Cleaning out the bottom of the shaft preparatory to sinking, and raising the south compartment from the 450, 900, 1300 and 1900 stations.

HALE & NORCROSS.—Repairing the 2100 level and cutting down the south drift on the 2400 level. The incline is being cleaned out.

BALCONIA.—The pump has been started up, and everything in and about the mine is progressing satisfactorily.

BRISTOL DISTRICT.

HILLSIDE.—Pioche *Record*, Oct. 10: The Hillside furnace is still doing good work, and prospects of a long and successful run, as the mines are now looking well and ore of a good grade are coming in fast.

LAUREL.—The "Laura O." mine, which has been lying dormant the past few months, has been leased to parties who will recommence operations this ensuing month.

THE NEW WELL at the mill of the Bristol S. M. Co. is down 70 ft, with 3 shifts on, making from 3 to 4 ft per day.

THE MENDOTA and Bay State mines are in particular looking well this past week, and shipping some fine-looking ore to the furnace.

THE HILLSIDE refinery, upon the completion of the new cupel furnace, started up some days ago and is running well.

EL DORADO DISTRICT.

FOR EL DORADO.—Pioche *Record*, Oct. 10: Quite a number of Piochers and Bristolians have lately departed for El Dorado canyon. They all think that it is the coming boom of Lincoln county, and we hope that they will not be disappointed.

EUREKA DISTRICT.

NEGOTIATING.—Eureka *Sentinel*, Oct. 16: It is reported that a New York company is negotiating for the purchase of a very valuable mining property in this district. The property has yielded handsomely in former times, but has been lying idle for some time.

THE OWNERS of the Sagebrush and Welsh King series of mines have commenced work, and from the previous reputation of the property, \$70,000 having been taken from it, they will soon be taking out ore.

OSBORNE K. McCULLOCK has been doing the assessment work on the Reeves & Berry mine, in Spring Valley district. One man is now taking out an average of \$200 per day.

MIRY MICHIGAN is taking out a large quantity of flux from the north and south end of the mine. He is also taking out some chloride ore that assays near \$500 per ton. He is working the mine under lease.

H. C. KIRKPATRICK is taking out rich ore from the Mountain Boy series of mines, which he has under lease. The Mountain Boy is a good property.

MOUNTAIN VIEW.—Upon the eastern slope of Secret canyon is situated the above-named mine, owned by Pat Dwyer and Eugene Dwyer. The mine has been leased to Bertrand furnace was running out metal. This mine furnished a large amount of ore, and the rock therefrom was only used as a flux. Its prospects are even better now, and the company contemplate running a tunnel to tap the Ruby Hill ore channel, which is certainly upon this ground. Many tons of good ore were taken from the old shaft at one time, and only the low grade was used for fluxing purposes. A new shaft has been put down 40 ft recently, and has run into ore of a medium grade. The projected tunnel will strike the ore channel at a depth of about 600 ft. Present indications on this property are very encouraging.

ESMERALDA DISTRICT.

REAL DEL MONTE.—Herald, Oct. 16: A station has been cut on the 800 level and the diamond drill started to work. The shaft is now clear and sinking has been resumed.

HICO DISTRICT.

SILVER SANDSTONE.—Pioche *Record*, Oct. 16: On Saturday last Henry Raymond returned from a visit of inspection around Hiko. In addition to a lot of fine specimens from the Green Monster and other mines near Silver canyon, he brought with him a specimen of sandstone, of similar character as that at Silver Reef, and had it assayed, and it went \$63 per ton. Mr. Raymond says there is a large body of this sandstone ore in the rear of the Green Monster mine; he cannot say that it is a mine, but it is an immense deposit that could be utilized to produce silver if a mill was in operation anywhere near that place. Mr. Raymond thinks that Hiko and vicinity will be doing well before long.

INDIAN DISTRICT.

THE MOONLIGHT MINE.—Silver *State*, Oct. 16: The Moonlight mine, in Indian district, some 6 miles south of Unionville, has, we are informed, been purchased by a San Francisco company, and work will be commenced forthwith. In early days the Moonlight was one of the prominent mines of the county, and sold readily at from \$30 to \$40 per ft. Considerable ore from the mine was hauled to Unionville and worked in the Pioneer mill, with good results. It was purchased years ago by a San Francisco gentleman named Ashby, who obtained a United States patent for it, and let it remain as it was the day he bought it. We hope he has sold it, and that the new owners will develop it as it deserves. It is to be one of the best mines ever discovered in the county. J. M. Brown, who had charge of the Pioneer mill while it was run on Moonlight ore, says it worked about \$100 to the ton, and a lot of the best ore, which was shipped to San Francisco, worked about \$4,000 to the ton.

PIOCHE DISTRICT.

BULLYHOOP.—Pioche *Record*, Oct. 16: Work is being pushed on the reduction works at Bulllyhoop. The stone warehouse is about completed. Oodbe & Hampton have purchased the Magnet tailings from John P. Kelley. These tailings are very high, assaying \$25 per ton. There are between 8,000 and 10,000 tons, and \$5,000 was the price of them—a very low price. Mr. Montgomery will work the Bulllyhoop tailings, and will also take charge of the firm's reduction works in that city, and Ben Hampton will take charge of the works at Bulllyhoop.

ARIZONA.

OUROS.—Chronicle, Oct. 10: The Southwest Alice lode and mine property is located about 1 mile north of Globe City, and as its name designates, is the southwest extension of the Alice mine. The main shaft is now at a depth of 100 ft and well timbered. Returns from the Isabella mill, where there was worked 33 tons, taken from here, unassorted, give the following results: 12 tons, net yield, \$196 per ton; 12 tons, 164 ounces; 14 tons, 162 ounces.

CENTENNIAL.—Eighteen men are at work under the supervision of W. B. Hellings and 10 more at work on the

Haskins road. Mr. H. claims that with their own teams the company can haul over this road to their mill site for \$2 per ton. The mine is looking splendidly, some ore taken out yesterday going over \$1,000, and all of it assayed over \$200. We found on the dump which has been assayed \$82. It is the intention of Sept. H. Hellings to mill everything between walls, and throw away nothing. The vein is from 3 to 5 ft in width.

MINERAL CREEK.—The mill frame is now up and pans, engine and boiler in place, and work being pushed to completion as rapidly as possible. At the mine a tunnel on the vein in 190 ft and will connect with the shaft at a depth of 100 ft. A tunnel has been started from bottom of shaft to meet the tunnel.

SILVER MOUNT.—The property is now in good shape for extracting ore and the mill will start up about the 20th.

MINISO NOTES.—The Lost mine, 6 miles north of Globe, now owned by Con. Burns, is attracting attention again on account of a recently reported rich strike. Thousands of dollars have been taken from this property, with very little outlay for work, and the extent of value of the ledge is not yet known. The claim was located in November, 1875, by Kentuck, under his name, and then sold for \$3,000.

SADDLE MOUNTAIN DISTRICT. 60 miles south of Globe, was organized last May and numbers now about 100 locations. The country here is described as unprospected. The formation is granite and granite, milling ore said to resemble Tombstone rock. Patterson & Woodson, Tucson, are working a number of claims, and Mr. G. E. Reed, to whom we are indebted for these notes, is opening some promising prospects. A good road will soon be completed through this camp, and Globe will get the local business which now goes to Florence.

SILVER DISTRICT.—*Territorial Examiner*, Oct. 15: Very fortunately for the district the purchasers of the wonderful silent mine have proven to be men who appreciated the immense value of that large deposit, which fact is evinced by the departure to-day of a special steamer from Yuma for Silver district, loaded with the engine, water-jackets and all the paraphernalia requisite for a first-class smelting furnace, with a capacity of 25 tons per day. The grading for a mill site at Norton's landing, owing to a force of 15 men being put on, is about completed. The contracts awarded are to Jesus Contreras, for hauling 25 tons of ore to the furnace from the mine, a distance of 5 miles, down grade, was for \$2 per ton; 75 cords of wood per month at the furnace to Joe Redonde at \$3.50 per cord; charcoal, 20,000 bushels per month, at the furnace, 15 cents per bushel. These people cannot be too highly commended for their energetic vim and thorough business tact, in endeavoring to place their property, at the earliest moment, on a self-supporting and dividend paying basis, which position it will occupy after the first run through the furnaces. One shipment was taken out, sent to San Francisco and the furnace immediately ordered, on the strength of that shipment. Mr. Cooker will make all necessary arrangements for the continued working of the mine, and the success of the last lode is among the most valuable in the camp, and I will have more to say anon.

Messrs. Dunbar & Sprinkle, of Oakland, are visiting our camp, for the purpose of securing and working property here. We have plenty of room for just such parties. The owners of the Gracie, a lode lying between the Clara and No. Name ledges, East Silver district, will be down from California in a few days and develop that lode.

TOYTO BASIN.—Mr. Francis, of the House & House mine, informs us that the mining interests of Toyto Basin are looking splendid. He also states that he expects the House & House mine, owned by himself and Mr. House, will be sold by the time he returns, which will be in a few days, as a telegram to that effect had been received in Globe. The Siebert property, which includes 16 mines, instead of being sold, as previously reported, was bonded to Siebert for \$500,000, the bond to expire on the 1st of the coming January. The company pay a forfeit, the exact amount we did not learn. Mr. House tells us that placer mines have been discovered in that section. In places very rich, yielding as high as \$1 to the pan of dirt. The gold is quite coarse, but the trouble is water, which is scarce at this season of the year.

PIONEER DISTRICT.—Pinal *Drift*, Oct. 9: Mr. Champion, of the Lewis Creek mine, for the past week. The tunnel is now in 140 ft. They are going down in the winze. Have good ore, chiefly galena and quartz, and get 100 barrels of water every 24 hours, which is disposed of easily. They are also cross-cutting in the tunnel.

MINERAL HILL ITEMS.—A correspondent sends us the following from Mineral Hill: I thought I would give you the result of our assessment work on the Baby mine and on the Rough & Ready. The Baby mine paid a 10 ft shaft; the pay streak is 2½ ft wide at the bottom of the shaft. Assays \$825 per ton in silver. On the Rough & Ready we sunk on the ledge 14 ft. Struck good pay ore, which assayed \$355.44 gold per ton. Both are owned by Henry & Hanlon and Schosbush of Florence. Henry & Hanlon will commence putting up 2 arastras in Box canyon this week to work the Shakespeare gold ore. The Mineral Hill mine are about 10 miles from Pinal in a southwesterly direction, on the new road by way of Seven Cottonwoods. They are within easy reach of both Florence and Pinal.

MINES BONDED.—D. M. Hyde has bonded to Peter Carter, Esq., of London, England, the following mines, situated on the grand belt between the Silver King and the Webster, for the amount of \$100,000. The Hyde, adjoining the Baltimore, \$15,000; Tornado, \$25,000; Solferino, \$25,000; Silver Coin, \$20,000. These are all excellently located, and are most promising prospects. They are, we are assured, as good as sold, and likely to draw into our district a large amount of English capital. Miners are busy at work all around us. We are assured that the mines of Queen creek—the Lewis, Gem and the Surpriser and several others, are looking better than ever.

COLORADO.

STARTED UP.—Colorado *Miner*, Oct. 9: The Farwell reduction works, which have been lying idle some time, on account of the breaking of the dam at Devil's Canyon, started up last Wednesday. They have over 200 tons of ore on hand, and are ready to buy more at all times, and promise to pay the best prices.

TENTH LEGION.—This lode is situated on Silver mountain, near Empire. The owners, Messrs. B. O. Russell & Co., have consolidated all the old ground and the extension and will commence operations at once. A new engine and boiler will soon be put in place.

SNOWY RANGE LODE.—This lode is situated in Atlantic district, and is being developed under contract, and shows a vein 5 ft in width, 12 inches of which carry silver galena and chloride ores, which assay from 100 to 300 ounces.

FENTON MINE.—This mine is situated on Brown mountain, and is being developed under contract, and shows a vein 5 ft in width, 12 inches of which carry silver galena and chloride ores, which assay from 100 to 300 ounces.

THE UNION TUNNEL.—The owners of this property are at present engaged in cutting out an engine chamber 30x60 ft, at the head of the Union tunnel, over the main shaft. An engine and boiler will soon be placed in position. When completed this will greatly facilitate the development of the lower workings.

NO. 5 LODE.—George Anderson & Co., who are stopping on the north streak above the tunnel level, have it rich. Their pay streak will average from 6 to 18 inches. They had a mill run last Saturday with the following result: First class, 465 ounces; second class, 235; and third class, 175 ounces silver per ton.

THE GEORGE PATRICK.—This lode is located on the Columbia mountain, in Hotchkiss mining district, on the Columbia belt as the Kollinor and Joe Reynolds. There is excellent timber and water in close proximity to the lode. The developments thus far consist of a main shaft sunk 50 ft on the lode. East of this about 100 ft is shaft No. 2, which is 10 ft deep and shows gray copper and some galena. The owners have just closed a contract to sink the shaft 50 ft further.

IDAHO.

YANKEE FORK ITEMS.—Herald, Oct. 12: Twenty tons of Summit ore, reduced in Morley's arastra, yielded nearly \$1,000, or about \$200 per ton. The quartz now shows a good deal of free gold. The mine is being worked day and night. John McVicker, the Salt Lake assayer, made an assay last week of the soft black sulphur ore lately struck in the Vienna mine, at Saw Tooth, and found it contained 2,625 ounces silver, and \$33 16 in gold. George Simpson returned Wednesday evening from a trip to the Wood and Lost River camps. He reports that Tom Covert, Al. Kyle and others have struck a new mineral belt between the Big and Little Smoky. The ledges are from 2 to 5 ft thick, well defined and contain rich carbonate and galena ore. The parties in from Wood River report developments going on briskly and the mines looking well. There are now about a dozen camps in the new carbonate field, and the smelting ore already in sight guarantees a bright future for that section of our Territory. The Bay Horse concentrating works are shipping large quantities of base bullion to the Omaha refining works. It is worth on an average about \$1,000 per ton. Another belt of quartz ledges was struck a few days ago between the Pansimari and Little Lost river. It gives promise of a good camp. It is reported that the Annie, on Mount Custer, has been purchased by the parties who lately bought the Lucky Boy, in the same vicinity. The lower belt on the Charles Dickens is in over 500 ft, all that distance on good ore. The mine never looked as well as it does at present.

MONTANA.

HELENA ITEMS.—Cor. Butte *Miner*, Oct. 12: Prospect ing for iron mines has been followed lately to a considerable extent in this vicinity. The Alta Montana company has contracted for and has now in course of transit 200 tons of iron ore taken from a mine situated on Dry gulch, a couple of miles above this city, owned by Messrs. Geo. Cleveland, Smith & Co. The ore is used at Wilkes as a flux for operating their silver ore. Mr. H. W. Curran has recently struck a huge vein of iron ore near Unionville, which carries about 75% of iron, besides a fair amount of gold. Mr. Curran has contracted to deliver 100 tons of the ore at Wilkes. Iron mining will soon become an important factor in our prosperity. A very large body of old-riding ore was discovered a few days ago near Park City, by Messrs. Springer & Constans. They have recently across the ledge for a distance of 10 ft without reaching the hanging wall. The vein promises to be a leviathan in size. Several tons of unassorted ore were crushed which yielded \$13 per ton. Considering the vast width of the lode, this yield may be put down as very flattering for the owners. Capt. Talon, who is in charge of the Park mine, is still busy at work sinking on the same. The Kennedy mine, at the Park, is at present lying idle. It will remain he worked as soon as some new machinery arrives. Capt. Spragins, of the Black Alder mine, near Unionville, has spent nearly the whole season in driving the tunnel to tap the monster vein. The Captain expects to be soon taking out ore.

NEW GOLD DISCOVERY.—Helena *Independent*, Oct. 14: We learn through Messrs. T. C. Power and J. H. McKnight that new placer and gold discoveries have recently been made in Meagher county about 5 or 6 miles from Fort Maguin. The new mines are located in what is called Maiden gulch. The gentlemen named had some gold from the new diggings which assayed nearly 900 fine. The extent of the mines, either as to the quartz or placers, is not yet known, but the discovery gives promise of being an important one.

NEW MEXICO.

THE CLIFTON PLACERS.—Herald and Southwest, Oct. 16: We mentioned last week that arrangements had been perfected for the consolidation of interests in the Clifton placers, and the commencement of operations upon an extensive scale. The claims are situated upon the Fresno, commencing at or near Steven's ranch, about 2½ miles above Clifton, and extending up the river about 4 miles. Gold is to be found in the gravel deposits of the lower part of the river, but the ground located lies principally on the west bank, and extends back, at places, for a distance of fully 3 miles. The deposits of gravel are simply enormous. On the Montezuma Bar, which is a 20-acre claim, it varies from 125 ft to 150 ft in thickness, and it is claimed that in places the bedrock cannot be reached even at the latter depth. This discovery shows an enormous prospect of about \$2 to the cubic yard, and is a somewhat remarkable as well as favorable feature that from nearly every portion the returns are in coarse shot gold. Enough work has been done here to cover about 4½ years' assessment. Other claims show up equally well. Five of the locations are in quarter sections, and every part of the ground gives good returns, the prospects varying from 0 to 45 lbs. to the pan. The pan. The Fresno Placer & Co., and others have made extensive developments, and the work has been so wisely directed that the richness and extent of these placers is patent even to the unskilled observer. There is every facility for operating by hydraulic process, and in the hands of a company sufficiently strong to introduce improved appliances and work by latest methods, the Clifton placers will doubtless prove to be one of the richest homanzas on the continent.

UTAH.

ALTA.—Cor. Salt Lake *Tribune*, Oct. 16: The City Rock is putting up new and commodious buildings, both at the main and lower tunnels. The Vallejo has been building extensively, and the Victoria and Imperial is putting up a new building on the site of the old one. The one owned by Or. Kates, and situated near the Evergreen hill, both have put up houses preparatory to the winter's work. Rumor has it that some 8 or 10 claims in the vicinity of Orizly Flat are in the hands of a New York syndicate and that work will be commenced upon them in a few days. The objective point at first will be the Snow Storm, joining the Utah on the west. There will then be the first strike of silver on the claim on the City Rock ledge. Who says we have no true veins in Cottonwood? The Lavina is being worked on lease. The lessees are taking out 100-ounce ore from near the 300 station of the main shaft. The Evergreen has lately made quite a large shipment of carbonate ore. This surprises the oldest inhabitant. The City Rock has 1,000 sacks of ore on the dump taken from the old workings on the discovery tunnel. It represents the labor of one man for 30 days.

BINGHAM.—The Nellie mining company own a group of mines at the head of Dry Fork. As yet this company is only in its infancy and developments have not been made on a very large scale. The ore carries a large percentage of gold and is free milling. The vein is well defined, and new pits are 25 ft thick, and the ore is very rich. The Kates, and situated near the Evergreen hill, both have put up houses preparatory to the winter's work. Rumor has it that some 8 or 10 claims in the vicinity of Orizly Flat are in the hands of a New York syndicate and that work will be commenced upon them in a few days. The objective point at first will be the Snow Storm, joining the Utah on the west. There will then be the first strike of silver on the claim on the City Rock ledge. Who says we have no true veins in Cottonwood? The Lavina is being worked on lease. The lessees are taking out 100-ounce ore from near the 300 station of the main shaft. The Evergreen has lately made quite a large shipment of carbonate ore. This surprises the oldest inhabitant. The City Rock has 1,000 sacks of ore on the dump taken from the old workings on the discovery tunnel. It represents the labor of one man for 30 days.

THE CARRIE STRIKE.—Salt Lake *Tribune*, Oct. 16: Specimens have been sent to the Tribune cabinet from the Carrie mine, Honeycomb Fork, Big Cottonwood, which assays 19½ copper, \$3,076 silver, and \$12 16 gold per ton. There is a very important strike to those interested, of course, and also the owners of property in that vicinity. The first west extension of the Telegraph, Bingham, has a larger ore body than ever. Hoisting works are to be erected this fall. The break in the Emma pump has been repaired and everything is now running smoothly. A great many miners are coming to the city, from the northern camp, to spend the winter.

Tall Panic Grass or Switch Grass.

We give on this page an engraving of a grass which will be recognized by many of our readers who hail from the prairie States, as it forms one of the leading factors in prairie pastures, especially in the low moist localities. It is one of the large family of "panic grasses", and specifically is *Panicum virgatum*, and is usually called "switch grass" by the farmer. It is a tall perennial grass, from three to five ft. high, and growing mostly in clumps or bunches. It is a good pasture grass and is relished by stock. It also makes good palatable hay when cut young, but it speedily becomes woody if left too long.

The analysis of the composition of tall panic grass, as made by the chemist of the Agricultural department at Washington, shows that it is not of very high nutritive value as compared with many other grasses. In our last note upon a pasture grass we instanced the difference in chemical composition between *Sorghum Halapense* and *Sorghum nutans*, two grasses of the same genus, showing the great superiority of the former. A similar variation in quality exists among the panic grasses. It may be seen by comparing the crab grass (*Panicum sanguinale*), which we lately illustrated with the one which we present this week, as follows, taking account only of matter acknowledged to be nutritive:

	Crab Grass.	Switch Grass.
Oil.....	2.87	1.75
Sugars.....	9.83	9.61
Albumenoids.....	9.89	4.52

The deficiency in albumenoids or flesh-forming materials is quite noticeable. However, although the analysis of a grass is one element in its value, there are many points of habit of growth, adaptation to peculiar situations, amount of yield, etc., etc., which must always be taken into account when judging a foreign plant.

Mining Around Benton.

Benton cannot rub her hands very gleefully over her late past and present mining outlook. Mining in the different districts around the camp has been and is apathetic. Mines cannot be worked without capital, and capital is possessed of a most nervous temperament. Gives capital assurance that it will be protected, and that its cent per cent will be prompt on collection day and capital is a liberal dealer. But lead capital to suspect that you think you know better how to handle it than it knows how to handle itself, and Mr. Capital straightway buttons up his pocket and retires to his hole. We know that capital wants to come into Benton, where it is needed, but capital feels that under the New Constitution and the laws sought to be enacted under it, there is no protection for capital here. For a year past Bodie has been steadily declining in its mining industry. No sensible practical miner for a moment believes that this is attributable to a diminution of mineral wealth in that camp. It is due solely to the timidity of capital in its present unprotected state. And we venture the assertion that, if the truth were and could be known, the reason why large numbers of workmen have been discharged from the mills and mines of Bodie district is not because there is not a vast amount of work there absolutely necessary to be done, but probably because the mine and mill managers have received private instructions from their moneyed superiors to work everything to its very lowest capacity until such a time as capital can see its way out of the lethargy by which unwise legislation has prostrated its energies. In view of the depressed condition of the mining interests the election of our next legislators becomes a matter paramount to all other considerations. No political prejudices should influence the miner or any man depending on the mining interests for his business in casting his vote for members of the next legislature. The mining counties should unite in sending a cordon of practical miners to Sacramento possessed of enough intelligence and energy to command the respect of their fellow members to influence and enforce needed legislation.—*Bentonian*.

PELICAN-DIVES.—For months past the owners of this famous property have been to work placing it in such shape that the immense bodies of mineral existing in the lower workings could be reached. Accordingly an engine chamber 40 ft. long, 30 ft. wide and 25 ft. high, has been excavated at the fifth level of the Perdue shaft, and an engine and two boilers will soon be in place. When this is accomplished the Perdue shaft, which is 600 ft., will be continued down, and new levels run. The fifth level has been timbered throughout. Such work as this has long been needed, and the owners realize the success that is bound to attend their efforts.—*Colorado Miner*.

MR. BURCHARD, Superintendent of the Mint, is of the opinion that the product of gold and silver in this country for 1880-81 will amount to \$60,000,000—of gold \$36,000,000, and of silver, \$24,000,000. This is a total of nearly \$86,500,000 less than 1877-78.

BIG CONTRACT.—The *Carson Tribune* says: Polson & Marlette have a contract with the Sierra Nevada Wood, Lumber and Flume Company to cut and deliver at their flume 40,000 cords of four-ft. wood at \$2.40 a cord, to be cut on the company's land at Cornelian bay, Lake Tahoe.

Agricultural Machinery for Mexico.

There has lately been published in Mexico a report to the Mexican Agricultural Society by a planter, who has been introducing new American agricultural machinery and superseding the old styles and means of tillage. The old style was based upon the ancient Egyptian plow drawn by oxen; the threshing was done by trampling out with animals. In order to accomplish even a small amount of plowing a large gang of laborers has to be supported, and there are large numbers of horses which have to be fed the year through, chiefly because of this labor they do in treading out the grain. Both these items of support for laborers and animals are heavy upon the farmer, and it seems a plain enough proposition that he must have means for doing much more work in the same space of time if his enterprise is to be very profitable.

chinery manufactured in the United States in preference to those of European manufacture, not only on account of the saving of time in their transportation and at less expense, but also because I consider that the people of North America have devoted more attention to the cultivation of the soil by machinery, and are at the present time producing the largest crops of grain at the lowest possible cost. From what I have seen, European agricultural implements are more solid, better made, more highly finished and constructed of better materials than the North American; but, on the other hand, if they are not more expensive, they are generally so cumbersome and heavy that our animals and our workmen cannot handle them as well.

It was found that the common laborers soon learned to operate the improved machines, although there was naturally some objection to their introduction by the laboring class, who were dispossessed of the chance to pursue the old system which called for their peculiar services and gave more of them employment. The advantages of the new system has, however, become so apparent to the farmers that there is quite a disposition among them to follow the example set by the man whose experience we are

TALL PANIC GRASS—*Panicum Virgatum*.

The matter of time for certain operations as it exists in some parts of Mexico is interesting and somewhat unlike anything in this State. The report of the Mexican experimenter to which we have alluded, describes local conditions in the district of Huejotzingo, as follows:

In this climate the land soon becomes dry and hard, and the season for planting soon passes away. Consequently planters were required to reduce their acreage of cultivation or increase their stock, in order to make the most of the planting season. Planting was done by the Egyptian plow, which, with the shallow furrows, although producing favorable results, did comparatively little work in a day. This moisture in the lands in this elevated portion of the country, quickly evaporates, and the planter, if it does not rain, or if he cannot irrigate his land, is compelled to suspend sowing, losing his previous preparation of the soil from the result of the slow operations, in practice in matters naturally requiring rapidity of action.

To free his operations from this embarrassment of slow work in a short working season, this enterprising Mexican resolved to introduce the best agricultural machinery from the United States, and the reasons he gives for choosing our machinery are well worth quoting, as showing a foreigner's opinion of the relative qualities of American and English machinery. In his report he says:

My attention was directed to the implements and ma-

citing. The contrast in methods and expense of the two systems is outlined as follows:

Plowing generally begins in the early part of July and terminates on the 4th of October. The first plowing is intended to turn over the soil, so that the moisture may disintegrate it; the second is crosswise, so that the ground may be well stirred, and the third leaves it clean, level and loose to receive the seeds. Under the old system, these three plowings had to be performed during the three months of July, August and September, to enable us to begin covering the seed early in October. Under the new system, the first two plowings can be done in the three months stated, and the last can be commenced a few days only before planting time, which operation can be performed in October and up to the middle of November. The result is that the plowing can be done with two-thirds of the stock, plows and hands formerly required; and as a greater interval elapses between the three plowings, the land receives a greater benefit. The rains start the weeds to growing; they have a longer time to grow, and on being turned under they have more time to decompose, thereby furnishing a green fertilizer to restore the waste of the land. I commenced using this turning plow at the second plowing. It opened a furrow from 10 to 12 inches in depth, and one-half yard in width. Three mules and a hand worked it, and left the ground well pulverized, free from weeds, and so prepared that the natural moisture was retained for a longer period, and the land perfectly clean. In the last five years the three plowings on this plantation cost on an average \$1,595 annually. This year they only cost \$1,211. The result is a saving of \$384 in money. The quantity of stock and number of laborers was reduced to one-third, and we have one-third more time to do the work in.

A Montana Enterprise.

The Butts (Montana) *Miner*, says: It is reported on reliable authority that arrangements are almost completed between Mr. W. A. Clark, owner of the Frank Moulton mine, which adjoins the Alice on the west, and a Salt Lake company for the transfer of a one-half interest in that noted property. The stipulation, it is understood, is to the effect that in consideration of a deed to one-half of the mine the purchasing parties will import hoisting machinery and Cornish pumps necessary to sink a shaft to a depth of 800 ft. and that they will erect without unnecessary delay a forty stamp dry-crushing mill with chloridizing furnaces, six 81-horse power boilers, 300-horse power engine, and other machinery of the most improved and durable pattern, embracing a total expenditure of \$250,000. Negotiations are not yet fully concluded, but there is little doubt that the project will be shortly consummated. It is believed that the mining machinery will be on the ground this fall, as in all probability it will be ordered next week, and that the construction of the mill will be begun next spring, on the opening of freight communication.

Of the permanence, richness and extent of the Moulton mine there can be no doubt. Located indisputably on the Rainbow lode, it has virtually been developed by the Alice shaft to a depth of 700 ft., and as the Alice vein has greatly improved in richness in the west levels, it is reasonable to suppose that the improvement continues into the adjoining property, the Moulton. This being the case the wisdom of opening up the Moulton on a large scale will be at once conceded, for not only may its development be depended upon to result in immense advantage to the owners, but it will be of immediate benefit to the camp, and will materially aid in bringing about the great silver mining era of Montana which may be confidently looked for as a natural consequence of the intelligent investment of capital.

Work Your Mines.

For some time past the Leadville *Circular* has persistently urged miners to cease their efforts to sell their mines, and work them for pay instead.

That this advice has been heeded to some extent, is shown by the increased output of that camp in August and September, notwithstanding the Chrysolite product has diminished one-half, and that of the Little Chief falls to merely nominal figures. In July the entire output of Leadville was estimated at \$1,050,000, in August \$1,250,000, and in September \$1,290,000. These figures indicate what a score of small mines can do if earnestly worked, in case of failure or diminished output of two or three large ones.

Individual labor and enterprise must precede and pave the way for capital in all mining districts, and now-a-days nothing will so inspire capital with confidence in the value of a mine as actual production, and sales of the product, whether it be 1,000 lbs. or 10 tons daily. Admitting the truth of the above, let owners who wish to sell properties that have pay ore in sight take that ore out and sell it, and armed with mill certificates—the only trustworthy proofs of value—they need not wait for buyers. If, on the other hand, they wish to retain and work their mines, is it not better to make available the output of ore, be it little or much, by applying its proceeds in cash to farther development, instead of drawing upon other resources to cover all the cost.—*Silver Cliff Prospect*.

Low Grade Ores.

The Boulder county, Colorado, *Herald*, contains a long article in praise of the practical workings of what is known as the Rouse concentrators, a description of which is too long for publication in these columns. From this cotemporary it appears that Mr. A. J. Van Deren, who discovered the John Jay mine at the mining camp of Providence, in Boulder county, has been testing low-grade ores from that mine by the Rouse process, with the following result: "Mr. A. J. Van Deren, proprietor of the John Jay mine, bought two of the tables, and began to work his thrice assorted dump pile and lowest grade ore from the mine. The result of the concentrate so astonished him that he could not believe all was right. Finally another was made. The dump pile, which had been picked over as many as four times and all good ore taken out, as was supposed, was crushed under the stamps. For nine hours, C. P. Wood, on the part of the company, and J. M. Van Deren, on the part of the John Jay mine, took samples alternately, every five minutes, and then had these samples assayed. The report of the assayer was \$14.45, which was low grade indeed. This ore was then run over the tables and 12 2-5 tons run into one. The concentrate was then sold at \$154.89, the machinery saving 86% of the assay value of the ore."

A NEW DISCOVERY.—Some very important discoveries of silver ore have recently been made about 12 miles east of Bodie, or six miles east of the Spring District mines. The ledge are large, strong and well defined, and the ore runs to silver. The quartz is less agatized than that of the Spring district—less so than on the eastern slope of Bodie bluff. Some San Francisco mining men of experience, who have become interested in the new district, are highly pleased with the prospect.—*Bodie News*.

THE ENGINEER.

An Underground Railway for New York.

There is now a definite prospect that within two or three years rapid transit trips will be made from South ferry to Central Park through a tunnel under Broadway. The certificate of incorporation of "the New York Underground Railroad Co." has been filed in the County Clerk's office and the plans for the road are completed. It is promised that the contracts for construction will be awarded within a fortnight and that by October, or perhaps November, the actual work of excavating will begin. This new company will be the successor of "The New York City Central Underground Railway Co.," which was specially chartered by the Legislature of 1868 and amended May 11, 1869. It is said that Gen. McClellan will be the president of the company, and that arrangements have been made in Europe for placing the heads of the company on favorable terms. The details of the financial arrangements cannot be learned until after the officers of the company have been chosen and the terms of the transfer of the franchise have been settled. The company expect that the road will be completed on or before June 1, 1883, so that it will be in operation by the time the World's fair is opened in 1883.

The road will extend from South ferry along the eastern side of the Battery to Broadway and Bowling Green and thence up Broadway, under Union square, to Madison square. The main line will continue from this point under Madison square and through Madison avenue to Forty-second St. Beyond this point the plans of the company do not at present look. But at Madison square a branch road will run on under Broadway to Fifty-ninth St. and Eighth avenue. Stations are at the Battery, Wall St., City Hall, Leonard St., Prince St., Astor place, Union square and Madison square; others on the Madison avenue line at Thirty-fourth and Forty-second Sts., and on the Broadway line at Thirty-fourth, Forty-second and Fifty-ninth Sts. are provided for.

The road will be built with two single-track tunnels, each 15 ft. high and 12 ft. 6 inches wide, which will run side by side, and separated by a brick wall. They will lie directly under the middle of Broadway, just below the water pipes. The tunneling will be done from a side street.

The tunnels will, as a rule, follow closely the surface grade of the streets, and the tracks will be at an average of 25 ft. underground. On Murray Hill, at Thirty-eighth street, however, the pavement will be 62 ft. above the tracks in the tunnels.

One of the chief advantages claimed for the tunnel will be its dryness. Built of brick and cement and with a hard white finish, the walls on all sides will be covered with asphalt. This will, it is expected, render the tunnel impervious to water, and the system of ventilation proposed is relied upon to prevent any dampness. Large 60-ton locomotives will be used. They will burn coke and consume their own smoke. The exhaust steam will be condensed, and nothing will escape to vitiate the atmosphere of the tunnel but a little gas. It is proposed to light them, as well as the tunnel itself, with electricity. An electric machine will be placed on each engine to run the headlight and the candles in the cars.

The problem of thorough ventilation has been considered carefully, and it is believed by the engineers that it has been solved. At the principal stations air shafts will rise up 75 ft., and other openings will be made at frequent intervals. Through these air will be introduced by artificial means.

The underground stations will, as a rule, be under street corners, and will be entered through the business blocks or other buildings there. Trains of from 8 to 10 cars can be run at a speed, it is estimated, of 25 miles an hour, including stops, and from 800 to 1,000 passengers will be able to find seats in each train. Trains can be run as frequently as every 3 minutes if necessary. The fare will be uniformly 5 cents. In the route up Broadway the old tunnel at Murray street will be passed by as of no use and no connection will be opened into it.

It is proposed in the future to extend the road from Madison avenue and Harlem either by further tunneling or by connection with the present tracks of the Harlem railroad through the open cut in Fourth avenue.

THE RUSSIAN RAILWAY SYSTEM.—The Russian railways are owned by the government. They have been built for the most part for strategic purposes, and without any regard to their use by the commercial or traveling public. Hence it happens, according to a late report by the British Consul-general Stanley, that in Russia, the railways are so many through lines, with no branch lines connecting with them. As an illustration he instances two lines which run parallel to each other for nearly 500 miles, and have not a single transverse line connecting with them for the whole of the distance. The result is that to get from one town to another, almost in the same latitude, the traveler has to take a long journey north by the one line and then return south by the other, so that to get to two towns only 350 miles apart, it is necessary to make a railway journey up one line and down another of 750 miles.

USEFUL INFORMATION.

How to Select and Take Care of a Watch.

This following advice may prove serviceable to those who have to rely on their own unassisted judgment in selecting a watch: 1. While adhering to taste and elegance, choose a watch thick enough. In a watch too thin or too little, the parts are too feeble, and have not sufficient space to work well. Watches as large as a penny piece, or those that are about as thin as a fourpenny piece, are mere experiments of skill, which should rather be regarded as masterpieces of patience, from which there is more vanity than utility to be derived. 2. Avoid in watches that construction which fashion has often prescribed, but which good sense condemns—such as those that point the days of the month, and so forth. Those extra pieces necessitate additional parts, which occasion friction, and encumber a space already too limited; though here it may be observed that complicated watches, such as chronographs, repeaters, etc., are now brought to a high state of perfection, at, of course, a correspondingly high cost. 3. Do not allow yourself to be attracted by the supposed advantages of new escapements. In watches for ordinary purposes, the lever and the horizontal escapements are generally adopted, as giving the best results. 4. The watchmaker who is conscientious will point out to you the limits beyond which a watch ceases to have the qualities necessary to go well. A watch procured for the design of its case may be covered or set with chasing and gems; it is then simply a jewel; but that which is bought for its utility ought to be as plain as possible, and this plainness itself is, as a rule, a distinguishing characteristic of its good quality.

We will now say a few words as to what we ought to do, and what we ought to avoid, to preserve a watch in good condition. Having obtained a really serviceable article, you should, in order to produce satisfactory results, follow out these rules: Wind up your watch every day at the same hour. This is generally done at the hour we retire to rest; or, perhaps, better still, at the hour we rise. Avoid putting a watch on a marble slab or near anything excessively cold. The sudden transition from heat to cold contracting the metal, may sometimes cause the mainspring to break. Indeed, the cold coagulates the oil, and the wheel work and pivots working less freely, affects the regularity of the timekeeper. When we lay our watch aside, we ought to slope it on a watchcase, so as to keep it nearly in the same position as it has in the pocket. In laying aside your watch, be sure that it rests on its case, as by suspending it free, the action of the balance may cause oscillation, which may considerably interfere with its going. If you would keep your watch clean, you must be quite sure that the case fits firmly, and never put it in any pocket but one made of leather. Those pockets which are lined with cloth, cotton or calico give, by the constant friction, a certain quantity of dust, which enters most watches, even those the cases of which shut firmly. If the watch is a "keyless" one, the key should be small, in order that we may feel the resistance of the stop-work; then we can stop in time without forcing anything. It is also necessary that the square of the key should correspond with that of the watch. If it be too large, it may in a short time cause the wind-up square to suffer from undue wear and tear, the rectifying of which is rather expensive. The hands of an ordinary watch can be turned backwards without much risk. It is, however, always better to move the hands forward. —*Exchange.*

HOT WEATHER HINTS.—If you care for no other rule, take this: What is healthy for that multiple pest, the fly, is the contrary for man, and vice versa—so watch the fly, and arrange your house in ways that discourage him: find what suits him and choose the contrary. Now what suits him is the combination of sun and light, darkness always makes him low-spirited, so choose darkness for yourself. Your heat in daytime will be in close proportion to the light you allow. The common notion "just like a man," that to be cool window and curtain must go up to get some fresh air, is one feminine instinct rightly condemned. Recall the closed parlor on the New England homestead, darkened from the sun by closed shutter and curtain, and you will remember that it was the coolest place in the house at noon except the cellar. So—on the sunny side of the house, at least—darken your rooms by shutter and curtain, closing windows as well, until the sun is passed; studiously keep out the sun's light and the air into which he is shining—darkness is coolness and light is heat. Breezes are not always enough, for the sun may give you a hot breeze. Of course, do without your range fire as much as practicable, and cook by gas.

THE WHITEWASH USED ON THE CAPITOL.—For the benefit of "Old Subscriber" and many readers, I here give the receipt for making the brilliant stucco whitewash used on the outside of the Capitol at Washington: Take half a bushel of good unslaked lime, slake it with boiling water (cover it during the process to keep in the steam), strain the liquid through a sieve, and add to it a peck of salt dissolved in warm water, 3 lbs. of ground rice, boiled to a thin paste; stir in, boiling hot, $\frac{1}{2}$ lb. of powdered Spanish whiting, 1 lb. of white glue, add 5 gallons of hot water; let the mixture stand a few days, covered from the dirt, and apply with kalsomine's brush. —*T. B. E.*

Smoke Burners in England.

The discussion of the smoke nuisance has brought into prominence several different kinds of patent smoke burners, the inventor of each claiming for his patent special merits, and each claiming his particular invention to be the best. In London smoke nuisance is punishable with a fine. The act applies to every furnace employed in working engines by steam, and every furnace in any mill, factory, printing house, dye house, distillery, habs house, etc., which is not constructed so as to consume its own smoke, or which is so negligently used that the smoke is not consumed. The penalty is from two to five pounds. As an ordinance is pending in the city council looking to an abatement of this nuisance, it is well first that our aldermen should make themselves familiar with the operation and effectiveness of the different smoke burners now before the public. Experience has demonstrated that it is not impracticable with skillful construction of furnaces, and careful management of fuel, to reduce the evil, for evil it surely is, to such small proportions as to be scarcely worthy of notice. The first conditions for smoke consumption are—such an arrangement of the furnace as to insure a supply of atmospheric air sufficient for complete combustion, and a judicious disposal of this fuel itself, in order that the vaporized carbon may be brought in contact with the air in a sufficiently hot condition. The first of these depends upon the construction of the furnace, the latter upon the care and skill of the foreman. With careful firing it is well understood that even an ordinary furnace will produce comparatively little smoke. —*Chicago Paper.*

It is high time that some action was taken in this city in regard to this matter of smoke burning; especially in view of the present purpose of utilizing a large area at the north end for manufacturing industries, from which point much of the smoke must be driven directly over the northern and central portions of the city.

NEW METALLURGICAL PROCESS.—According to the Philadelphia *Public Ledger*, a new process for using up old metal has been invented by an Englishman named Drake. The resultant is a new metal which is said to possess extraordinary strength and ductility. The process consists in mixing up old steel with a patent compound, and subjecting the whole to an intense furnace heat, when the particles amalgamate. Steel made on this plan has been turned out at the Hunslet works, and sold readily for £45 per ton. The process is said to be second only in importance to Bessemer's invention, and it will be especially valuable as finding use for old Bessemer steel rails.

GOOD HEALTH.

Piles—Their Cause and Cure.

Piles are simply the blood vessels of the rectum enlarged. They are generally caused by constipation. The arteries carry the blood down to the rectum and divide into smaller vessels, which inosculate with the smaller veins of the rectum. These when distended cause the piles. The heart forces the blood along the arteries, and the current of blood loses its force as it returns in the veins, so that a pressure that will not interfere with the current in the artery will in the veins. The blood is forced into the arteries of the rectum and thence into the veins; is prevented by the pressure of constipation from returning, and the distended vein becomes a pile. These, being irritated by hard movements, become ulcerated and we have a bleeding pile, when the wall of the vein is ulcerated through.

Now for the cure. Remove the cause. Keep the bowels free with good, soft, poultice-like movements. Old Prof. C. R. Gilman (who in his day had no peer in his specialty of diseases of females in New York) used to say that the worst case of piles you could find would get entirely well in 6 months and stay well, if you could only get the patient to have soft movements. The compound liquorice powder, which may be obtained of any druggist, is a gentle laxative and splendid for this purpose; also, an ointment of stramonium and tannin is recommended. The stramonium soothes and quiets the irritation and the tannin acts as an astringent to contract down the open vessel. Smear a mass as large as a small marble all around inside the bowel after each movement. Again, a still greater advantage will be gained by a soft sponge to be used instead of paper after each movement. —*Medical Journal.*

HOT WEATHER HINTS.—Dress needs reform, for our masculine garments in particular are robes of martyrdom to absurd conventionalism. An Irishman, walking out in summer clad in extreme winter style, replied to remonstrance that he thought what was "good to kape out the cold was good to kape out the heat," and his philosophy was perfectly sound in the abstract, like all true philosophy, only when he made it concrete on his own body he got it wrong. A thick flannel is the costume when working in a foundry, but not ordinarily; because the foundry's temperature is higher than the body's, while the out-door air of the hottest day is lower. In winter we wear covering in order to keep the body's heat from passing off;

in summer, to avoid scorching by the direct rays of the sun, which are much hotter than the air. This is the only natural and physical reason for covering; usage, to which deference must be paid, is the only other. But we do not get far enough away from the rigidity of usage when heat comes. Why should we resign draperies exclusively to the women, who clad in them look cool, but do not help our own misery? Why should "shirt sleeves" be voted utterly to be an outrage on refinement? They need not be taken in puribus; some modification of them, in garments of more open texture and ampler cut, could be devised were somebody to dare. Now, the wide "pantaloonery" and alpaca or linen coat, with (in cases of extreme hardness) the absence of "waistcoat" and low shoes and umbrella take us to the verge of hazard. We must be elegant, in full dress, and at ease, though we melt, as if physical discomfort and refinement could ever go together.

WOMEN'S HEADACHES.—The New York *Herald*, which devotes most of its space to news, has published a brief editorial on women's headaches, which is certainly more suggestive than many of the articles in that paper. One principal reason why women suffer more than men with headache, is the fact that their life is largely indoors, and they are not able to take so much physical exercise. There is very little complaint of headache at summer resorts, where the windows are always open, and games and excursions constantly tempt people into the open air. Girls who ride, row, sail and shoot, seldom have headaches, and the same is true of those who work in the fields, as women in many countries do. Headaches might be almost banished from civilized society by a wise and careful system of physical training, and a rational system of diet. We ought to be ashamed of having a headache as of being unable to read or write, or speak our language correctly. —*Herald of Health.*

TREATMENT OF BURNS.—Various are the modes of treatment proposed for burns. The last, which appears to come from "good authority," we give below. There can be no question about the carbolized water—although salicylate of soda—one to 20 or 30—would undoubtedly be more useful. Dr. Shady, of New York, recommends that burns be treated by applying a paste composed of three ounces of gum arabic, one ounce of tragacanth, one pint of carbolized water (one part to sixty), and two ounces of molasses. The paste is to be applied with a brush, renewed at intervals, and is stated to be a successful method. Four applications are usually sufficient, the granulating surfaces being treated with simple cerate or the oxide of zinc ointment, as indicated.

WORTH KNOWING, PERHAPS.—Catarrh is called "a fashionable disease," and it really appears as if there was much truth in the saying. It is astonishing how many persons are afflicted with the disease in this city, and how little relief they receive from the generally advertised remedies. Still, it is contended that catarrh can be cured, and many certificates are published to that effect. The latest remedy is given by a Baltimore paper, which says that chewing a twig of a eucalyptus tree, and swallowing the juice, will effect a cure in half an hour. Those afflicted with catarrh might try the prescription, but as faith is necessary to the working of miracles, it is a matter of doubt whether, without faith, a eucalyptus twig will prove a panacea.

MOUTH DISINFECTANT.—A lady asks us to name some harmless mouth disinfectant. It is not a good sign to have a mouth that needs disinfecting. There must be some fault with the stomach, or liver, or bowels. The first remedy should be to regulate the diet and other habits, so that the functions of excretion shall be perfectly established. Then if the mouth needs cleansing with any thing more than pure soft water, a harmless lozenge may be made by rubbing 24 grains each of permanganate of potassa and hyperoxydate of barium into a mass with sugar and glycerine, and dividing it into 14 parts. A very ill-smelling mouth will be thoroughly disinfected by its occasional use. —*Herald of Health.*

CAN BREATHE THROUGH HIS EARS.—Samuel Bremley, a harper of Mystic River, Conn., can breathe for a time without the use of mouth or nostrils, as communication is kept up between his lungs and the atmosphere through his ears. That this is the case, he gives demonstrations when indulging in a cigar, by exhaling the smoke through the same channel.

INJURIOUS TO THE EYES.—Medical investigation has shown that some of the occupations for children at kindergarten schools are calculated to injure the eyesight. Among these are the pricking holes over a tracing on paper, braiding bright colored hands of paper, or sewing fine silk upon tracings.

SANITARY ERRORS.—It is a popular error to think that the more a man eats the fatter and stronger he will become. To believe that the more hours children study the faster they learn. To conclude that if exercise is good, the more violent it is the more good is done. To imagine whatever remedy causes one to feel immediately better is good for the system, without regard to the ulterior effects.



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SAN FRANCISCO:

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The Week.

The beautiful weather which October brought us, has continued during the past week, and already some are beginning to fear a "dry year," because no rain have yet come. East of the Rocky they have been having some terrific storms, attendant with loss of life and property. On this coast, the elements have, as yet, given us no signs of an approaching winter.

Mining stocks continue to be dull, with no present indications of any change. It will take a good fat ore-body on the Comstock to start up a "boom" again. It seems to be the mission of the Comstock to start up stock. The prosperity of other sections does not affect the market. Eureka district is now as prosperous as any on the coast. Utah is speaking very loudly of its prosperity in the hullion shipments its mines are making. A good many men are leaving Arizona for Sonora, on prospecting expeditions, but there is always a certain number to whom "the hills look green afar off."

The mining interests, generally, were never in better condition. The field is much broadened, and the industry on a better basis than ever before. In California we are working away quietly, and not advertising our properties so much as the newly discovered regions, but we are turning out just as much bullion as ever, and at the end of the year it will be found we are still second on the list of hullion producers. Neither Colorado nor Utah, though both have gained, have caught up to California.

The Fulton Iron Works are building a first class set of hoisting works for the Tombstone M. Co. in Arizona. For the same district they are building a 10-stamp mill for the Sunset Co. and a 20-stamp mill for the Grand Central, both to have pans, settlers, etc.

Blunders in Mining.

It seems strange that people will ignore the experience of others so completely as is done in mining operations. The same blunders and same mistakes will be made over and over again in the face of previous failures. People continue to put up quartz mills before mines are developed enough to furnish the mill with ore. They put dry-goods men in to manage mines where first-class experienced miners alone should be. They engage as amalgamators, or furnace men, people without the slightest knowledge of metallurgy, and spend more money on machinery than the mine warrants. They send out as experts to examine property men of whom they know nothing, other than that they call themselves "experts." They invest money on the say so of such people without other inquiry, when in nine cases out of ten their own judgment would be better.

Every day we hear of the repetition of mistakes and blunders for the twentieth time. This new men in mining seem inclined to exercise more talent in getting into trouble than in keeping out of it. The people who get up swindling processes can always find a certain number of credulous men with money who will help them out. Any 30 ft. hole in the ground, well puffed and advertised, will sell as well as a good mine. People will buy the stock in any concern of which they hear frequently, and do it without enquiring anything about it whatever. Therefore, all sorts of swindling concerns are put before the public.

Within the past six months or a year, since Eastern people started into mining, it has been painful to see the mistakes which have been made. Errors and blunders, which experienced miners would avoid, have been committed time and time again. The same will be done many times more no doubt. Telling about it will not stop it. People seem to prefer their own experience to that of others, even in a business of which they know nothing. This is human nature, and all the preaching the newspapers can do has very little effect. A case of this kind came under the observation of the writer a short time since. A gentleman was very enthusiastic about a "new process" which was to work wonders. He was told it was not new; had been tried many years before and had been a failure. Was told to come and look at certain records to prove these assertions before he invested his money. Notwithstanding this, he did invest several thousand dollars without looking at the said records, and, as a natural result, lost his money.

This is not an isolated case by any means. Only this week we hear of people building a "mining boat" to dig up gold from river beds by vacuum process in Montana, "the same as is done in California," when we have proved a dozen or more times that no such method of mining has been successful. Men are even now investing their money to help a process where gold is made out of water, notwithstanding the fact that a State official has investigated the process and pronounced it a fraud. People are putting money into mining machinery constructed on principles which experience has proved to be fallacious.

In fact, over and over again are the same old blunders made and the same old mistakes committed. The journalist whose advice is unheeded, simply performs his duty in chronicling the failures which result, solacing himself with the reflection that "I told you so."

Deep and Shallow Mining.

There are very many mining districts on this coast which not long since were flourishing and of which we now hear little. At the same time there are several which, after lying idle for a long time, were started up again manfully. The reason why many of these were abandoned was because the first comers did not go down deep enough. They scratched around the surface, and when surface pockets were gone, they went too. Our biggest bonanzas have been from deep mines; but some people often get discouraged too soon.

A gentleman in Utah the other day being interviewed by the Salt Lake Tribune about mining affairs in Utah, was asked if he didn't acknowledge that the old camps were not as lively as they used to be. His answer was as follows:

"That's just what's the matter with Utah. It isn't that the mineral is lacking, but we have not been mining here at all. There is Birmingham, as long as a miner had to climb a tree to get at the ore, why every stump and grass root in the camp had a miner at it; but just as soon as they had to get down below daylight, they stopped. You can't read a book through the cover, and just as long as mine owners expect to find ore above the grass, so long will the old camps be dull. I defy any man in this world or the next to name any mine that has played out. It isn't in the order of things, because when you get down on a ledge below mineral, you must have passed the source, and that can't be done."

The amount of capital invested in the manufacturing enterprises of Alameda county, California, are \$1,300,000.

Ledges in Placer Claims.

The Commissioners of the Land Office has decided that lode claims within the limits of a placer tract, for which claims patent is not sought in the placer application, are excluded from the placer patent, though lode claims adversely held may be excluded from the survey of such placer claim.

A man named Sanderson applied for a patent on a placer claim in Colorado, posted his notices, etc. Before this time of publication was up, a number of people protested, alleging that they were owners of lode claims on the same land. They did not commence suits in court, but relied on the Land Office to protect their lodes from the patent. Sanderson voluntarily excluded certain lode claims from his application. The Commissioner finally sent, at the expense of the claimant, a surveyor to survey this placer claim. His instructions were to the effect that where lode claims have been duly located, and an application for patent to placer land which embraces such lode claims is made, the plat and survey of such placer should correctly show the locus and extent of the lode claims, that while it is true that the patent for the placer will except from its operation all lodes and veins known to exist at the date thereof without assuming to do what would be impracticable, viz: to name and describe them; yet where, as in this case, the owners of certain lode claims have by protest advised the Office of the existence of such claims, they should be excluded by metes and bounds. His instructions were to exclude not only such lodes as were admitted to exist, but also all others duly located.

The deputy who made the survey designated, by dotted lines, on the plat several "lodes," but said: "These pretended lode claims have no mineral lode deposit or rock in place, or anything entitling them to the name of lode claim; the shafts are in wash or drift; and I hereby certify that no known lodes exist upon the foregoing described placer other than have been excluded from within the exterior boundaries of placer."

The Commissioner decides as reported in Copp's Land Owner that a patent issued for a placer claim which contains a vein or lode, the existence of which is known, is not a conveyance of any lode deposit which may be included therein. And all placer patents issued embrace a clause of reservation, as follows: "That should any vein or lode of quartz, or other rock in place, bearing gold, silver, cinnabar, lead, tin, copper or other valuable deposits, be claimed or known to exist within the above described premises at the date hereof, the same is expressly excepted and excluded from these presents." Notwithstanding the general reservation quoted, the Commissioner deems it his duty before issuing patent for a placer claim to require all vein or lode claims, the existence of which is admitted by the applicant for patent, but not applied for by him, or is reported by the Surveyor-General, to be excluded by actual survey, and the placer claimant should not be permitted to pay for the area so excluded; it follows that if any lodes or veins be known to exist at the date of patent to the placer claim, the owner thereof may make application for patent thereto at the proper land office precisely as if no patent had been issued for the placer claim, and upon regular proceedings being had and proof furnished that said lode was known to exist as aforesaid patent will issue.

EL DORADO CANYON.—J. W. Joachim, Deputy Mining Recorder of El Dorado District, writes to the Pioche Record the following particulars of this District: El Dorado canyon is situated in Lincoln county, Nevada, about 200 miles south from Pioche, being bounded on the southwest by San Bernardino county, Cal., and on the east by the Colorado river. A fifteen-stamp mill belonging to the Southwestern mining company, is now in operation, running on ore from the company's mines, the Techattacup, Savage, etc. Wood is furnished in the canyon from Cottonwood island and Mohave valley, at \$8 per cord. Water has lately been obtained in plenty by digging wells two miles south of the O. K. mine. About 65 men are now employed in and about the canyon. This place where the new mines are located, is situated about ten miles southwest from the Southwestern mining company's mill, to which mill there is a good road from the mine; down grade all the way and no falls. Among the new locations are January, down 35 ft.; the O. K., down 25 ft.; Eldorado, 15 ft.; Lone Star shaft, 25 ft.; Silver Eagle Tunnel, 70 ft.; Silver Legion shaft, 50 ft., and the Morning Star. The Silver Legion has been bonded for \$10,000 to T. B. Pehy, and two-thirds of the Silver Eagle has been purchased by James Cronin. J. B. Crocker, Goodhue & Co. have purchased the Clara, Standard, Independence, Columbia, Constitution, Union Flag, and Fifteen-two. The present outlook of the canyon is very bright.

The new stamps in the Alexander mill have worked smoothly since they commenced operation, and a vastly increased hullion product may be confidently expected. A shipment was recently made of \$7,193.12.

Mining Notes on a Recent Trip Through Amador County.

Amador county differs from the counties both to the north and to the south in that its mining industry is confined at the present time almost entirely to quartz mining, comparatively only an insignificant amount of gravel mining being done. The principal quartz mines are on what is known as the Mother lode of California, which crosses the county from north to south in the foothill region. Other important mines are at Volcano on the east, and at Drytown on the west.

At Jackson, in the southern part of the county, there is at present considerable activity in prospecting for new locations and in developing the old ones. The Zelle mine here is located on one of the largest ledges in the State. The work being done is on the 600 level, and consists of crosscuts and drifts to more fully develop the ore body. The new 20-stamp mill is unquestionably one of the finest in the State. As the ore contains a considerable percentage of rich sulphurets, very complete works for their reduction are being erected. At the Kenady mine only prospecting work is being done. The Kruger and Vaughn mines are at present full of water, but it is reported will soon be started up. About two miles east of the town is a pocket mine, owned by Wm. DeWitt, in which several rich strikes have been made during the last few months.

Sutter Creek, about five miles north of Jackson, is a mining town of considerable importance. It is well built up, contains several fine stores, churches, hotels and two foundries, and has none of the played-out look so common among mining towns in California. The town is to a great extent supported by three large mines. The Amador mine, one of the oldest and deepest worked mines in the county, is taking out low-grade ore enough to run its 40-stamp mill on full time. The Mahoney mine has its main shaft down 800 ft., and is opening and prospecting its ore-body preparatory to supplying its 40-stamp mill which has just been built. The mill is to be run by water power. At the Lincoln mine some ore is being taken out, but no large quantity, as their mill is at present working on Mahoney ores.

At Amador City the celebrated Keystone mine is being retimbered. The mill also is being thoroughly overhauled and improved. At Drytown and Plymouth the principal mines are running and paying well. At the latter place is the largest mill in the county, running 80 stamps. New hoisting works are being put up there to work the ledge to a great depth.

Nearly all of the ore at present being taken out and worked is of low grade, from \$3 to \$15 per ton, and is generally free milling, carrying only a small percentage of auriferous sulphurets. Very little improved sulphuret-saving and concentrating machinery is in use; though so large is the aggregate of rock crushed, that its introduction could hardly fail to be profitable. A noticeable feature, as one travels across the county on the quartz belt, is the number of idle and abandoned hoisting works and mills. In some instances it seems as though expensive machinery had only been placed in position to rust and decay.

Advice to Eastern Investors.

We have had more experience on this coast in mining matters than the residents of communities in the Eastern States, simply because we have the mines here and they have not; and we have been mining 30 years, while they have just begun. Of course, we speak of mining for the precious metals. We see many of them now making blunders which we try to prevent, but our efforts are not always crowned with success. A good many of the people there look upon us out here as a sort of uncivilized crowd anyhow, and think they know as much about the business of mining as we do, and perhaps a little more. Hence the advice given by the press of this coast has gone unheeded in many instances, where money would have been saved if attention had been paid to warnings against frauds, doubtful speculations, etc. The newspapers East have not always done us justice in this connection, but the Boston Economist, in a recent issue, acknowledges the mistake, and says: "As a general rule, the Eastern mining papers greatly ignore the mining districts of the Pacific slope, and when they do speak of them editorially they are apt to refer sneeringly to 'California practices,' or 'the methods of the Comstock'; apparently oblivious of the fact that the product of the Comstock lode alone has been \$300,000,000, and that the dividends disbursed to shareholders in the mines west of the Sierra Nevada mountains since 1849 aggregate about \$136,835,000. In the matter of stock speculation and the management of affairs on the exchanges, the California papers have a right to speak authoritatively, for their experience in mining matters has been greater than ours, and their knowledge of the men who have joined us is derived from a long association with them. When, therefore, these journals give Eastern managers advice—that is, when they speak soberly, and not in a spirit of haughty arrogance—their advice should be received in the spirit in which it is given, and heeded."

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held Wednesday evening last. Donations were received as follows: By Jerome Tay—A specimen of obsidian from Indian quarry on northeast side of Mount Shasta, Siskiyou county, Cal. By J. T. Gibbs—Hydraulic limestone from Benicia. By Dr. A. B. Stout—Obsidian and bottle of water from hot springs on Mono Lake island, and a bottle of Mono Lake water. By James W. Wilder—Blue clay, 126 ft. deep in artesian well; yellow clay sea shell coars, 118 ft. deep in artesian well, corner of Folson and Eleventh streets; iron-lookingslag, 110 ft. deep in Brickwedel's artesian well, corner of Franklin and Fulton streets; wood in blue clay 129 ft. deep, from the same well, and wood 105 ft. deep in sand and gravel, two ft. below the rock. By J. A. Mellon of Colorado—Seeds of *Prosopis juliflora* and seeds *Prosopis pubescens*, specimens of bread made from them by the Indians; also seed of "wild sage." By Charles H. Gilbert—*Brachyopsis zosterium*. By J. A. Mellon—*Sceloporus undulatus*, *Gerrhonotus muticarinatus*, *Pituophis catenifer* and *Charinca plumbea*.

Mesquit Bread.

A communication was read, written by Capt. J. A. Mellon, of the sloop *Southwest*, Colorado river, who furnished cans containing seed of the mesquit tree, explaining that the screw-bean bears two crops a year, the first ripening in June, the tree being in bloom for the second crop at the same time. He had a wheel on his raft made from the wood of the screw-bean, and it acted admirably, as it did not check, and it shrieks very little, although exposed to the sun. The Indians depend mostly on the mesquit for their supply of winter's food. He sent a sample of the bread they made from the fruit. When the bean is ripe, they collect it in large baskets, and pack it to this nearest point on the river, where there is a ledge of rocks. In all those places they have mortars formed by grinding into the ledge, and there the old squaws work pounding it up, molding it in baskets, and drying it in the sun for winter use. Their leaves sometimes weigh 20 pounds. When the crop is all harvested, they build a platform about three ft. off the ground, and store it away until their corn, pumpkins and melons are gone, when they draw on their mesquit bread. The beans are also used as horse feed, and at the mill it sells for three cents per pound. When there is a scarcity of hay, barley and beans are the food, and when hay is plentiful, beans and hay are the fodder, and the teamsters say it wears first rate. He believed that the screw-bean would make the finest of tree-nails for ship-building, as the longer it stays under water the tougher it becomes. He did not think it would grow north of 33° of latitude on this coast, and on the Atlantic not north of 30. In good soil it is a rapid grower, and he thought it would make a good hedge plant. Dr. Kellogg called attention to the durability of the mesquit tree, and explained that he had been in a building which had stood almost a century, and the wood was perfectly sound. It partook of the nature of our fir, and, although the wood was somewhat brittle, it was, when dried, very rigid. The mesquit furnished the very best kind of girders for internal structures. Dr. Englemann, of the United States Forestry Commission, who was requested to dwell upon the peculiarities of the mesquit, stated that he had just returned from the southern part of Arizona, where he found extensive woods of the mesquit tree, miles in extent and breadth, south of Tucson. There the trees were larger than is generally seen, some of them being a foot and even two ft. in diameter, and something like 30 or 40 ft. high. They had the aspect of the willow tree, but he would compare them to the olive of southern Europe. Straight stems were very rare, they being very much inclined to be crooked. The Mexicans managed to cut posts or timber of eight or ten inches in diameter, and ten ft. long, which they sold in Tucson, where they were used in building, proving almost indestructible and unaffected by moisture. They were used as girders over openings, such as doors and windows. They are very durable, as was proved by the fact that mesquit timber was found in those ancient dwellings on the Gila river, the prehistoric dwellings well preserved. The wood was very heavy, and was the best for fires that they had there, and probably in existence. It afforded very little shade, and the ground beneath the tree was covered with grass and low herbaceous plants.

Oak and Cactus.

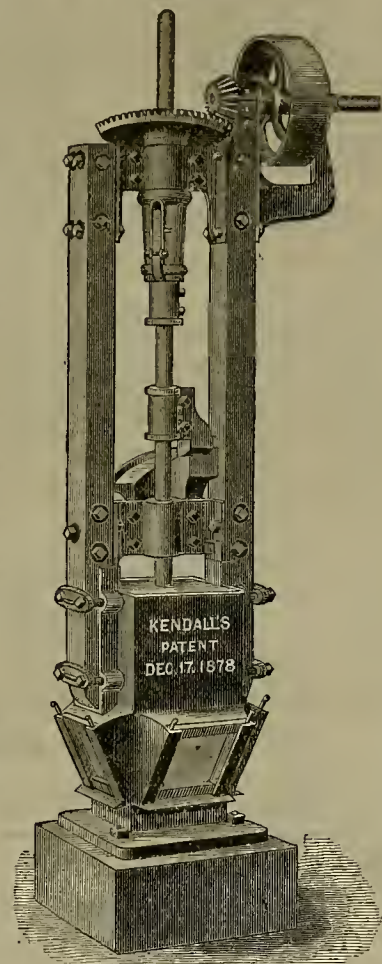
Some beautiful elongated acorns had been presented to the Society, and some of the members requested Dr. Englemann to make some remarks on oaks. He stated that it was well known amongst carpenters and wood-workers generally upon this coast, that the oaks here are quite inferior to those of the East. There was only one species here which was really of any value, and that was a species of live-oak, which was very hard, heavy and durable. There were four or five species of white oaks upon this coast, but none of them are equal to the Eastern white oak. There were 10 or 12 species altogether here. The President noticed that specimens of the *nostoc* had been donated. It grew rapidly, and it was only troublesome when it began to decay, giving the drinking water a very unpleasant, if not unhealthy, odor. Dr. Parry handed up a sam-

ple of cactus grown in this country. Dr. Englemann was again requested to say something about the cactus. He complied by stating that the cacti are found a foot and even two ft., in diameter, and from 30 to 60 ft. high. The wood is distributed in separate bundles, which are as long as the cactus itself. These sticks, more or less round, are two inches in diameter. The Mexicans cut down cactus, and allow the fleshy or pulpy part to decay, collecting the sticks which are brought into Tucson by wagon loads, and used like laths. They are very strong, usually do not break, and last almost forever. The cactus itself was much more common than was generally known, the hills around Tucson being covered with them.

The Kendall Quartz Mill.

We present herewith an engraving of an improved quartz mill invented by Stephen Kendall, of Jackson, Amador Co., Cal. The engraving represents the mill with all its late improvements.

The improvements consist in the novel construction of the cam, and in the employment of a peculiarly shaped tappet, which is secured to the stamp-stem so as to revolve with the stamp



The Kendall Quartz Mill.

at the same time that it lifts. The cam is a plain curved incline, mounted on a rubber cushion, so as to prevent jarring. The stamp is raised by the tappet rising on the incline or cam, and as it drops off the cam a grinding action is produced by the rotation of the stamp until it again rises.

By this means both a crushing and grinding motion is produced in the stamp. The mortar is constructed in such a manner as to accommodate one stamp only, but having three discharge openings, fitted with screens, the discharge is fully equal to the work the stamp does. The stamp is precisely the same as the old style, with the exception that it is operated by different devices, and has the grinding action above specified.

The rotation of the stamp is accomplished by a belt and horizontal pulley at the upper end. A peculiar clutch is used, one part of which is so connected as to rotate with the pulley, while the other part is secured to the stamp stem so that when the pulley is rotated the union is such that the stem and stamp are allowed to rise and fall freely by the action of the lifting cam. This clutch is the subject of a separate patent from the original one obtained by Mr. Kendall, the improvement being an important one.

Both a grinding and a crushing action are produced by the peculiar motion of the stamp, giving an increased capacity over the simple dropping stamp of an ordinary battery.

The inventor gives us the following figures concerning weight and capacity: No. 0, 1-horse power, has a capacity of 1 ton in 24 hours; the stamp weighs 100 lbs., whole mill 600 lbs.

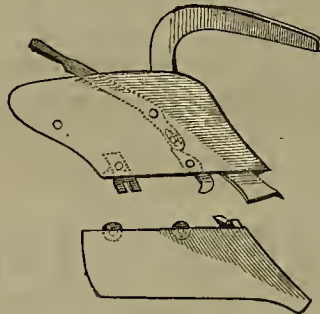
No. 1, with 400 lb. stamp, weighs 1,900 lbs. and has a capacity of 2½ tons. No. 2, with 800 lb. stamp, weighs 3,500 and is of a capacity of 5 tons. No. 3, with 1,000 lb. stamp, weighs 4,500, and has a capacity of 8 tons. No. 4, with 1,500 lb. stamp, weighs 5,500 lbs. and has a capacity of 6 tons per 24 hours. All these are based on No. 6 screen in battery.

Mr. Kendall has many testimonials from those using these mills as to their efficiency and capacity. The mills are built all ready for shipment, no millwright being necessary to set them up. The mill is not now an experiment, but has been for more than two years at work at various places. The mills are being made at the National Iron Works (Marschutz & Cantrell), N. W. corner Main and Howard streets in this city.

Plow Share Fastener.

Speaking of plows, for the plowing season is at hand, we introduce a small engraving of a new device for attaching the share. It was invented by Jacob P. Patrey, Dunnigan, Yolo county, Cal., and patented through the MINING AND SCIENTIFIC PRESS Patent Agency. It has been tested by a number of Yolo county farmers, and their testimony has been given in our advertising columns. To attach the share to the plow, all that is necessary to do is to catch the hook (which is seen at the lower edge of the mold-board in the engraving) to the stud or projection on the share near it. This hook is attached to a compound lever shown by the dotted line in the engraving, and when the lever is thrown over, the hook draws the share up lightly and snugly into its proper position. The lugs on the upper edge of the share fit into the slots on the lower edge of the mold-board and prevent its moving from place.

When it becomes necessary to remove the share, by throwing the lever back, it is released readily and quickly, and can be taken away and sharpened, or another share substituted. The lever and ends are on the rear part of the



Patrey's Plowshare Fastener.

plow, and, therefore, form no obstruction to its passage through the soil. This fastener can be attached to any ordinary plow that has a mold-board and share.

INSTRUCTIVE LECTURES.—The citizens of San Francisco and Oakland are just now enjoying a rich literary treat, in listening to a course of lectures now in process of delivery by the eminent historian and lecturer, Dr. John Lord. The subjects chosen are "The Great Characters of History." These lectures are of the very highest order of merit, and are listened to and appreciated by large and intellectual audiences. The Doctor is no orator and makes no pretensions to elocutionary grace; but in regard to the subject matter of his discourses, and the manner in which they are prepared nothing but terms of high praise can be employed, and no thoughtful person can possibly fail to be greatly interested and instructed by listening to them.

DR. LAW, a well known Black Hills mining man, called at our office this week. The Doctor sailed on the Pacific Mail steamship *Colima* for Panama. He goes on a trip to the mining regions of New Granada, Peru and Chile. Our readers will be favored with his views on the mining regions of those countries, as he has promised to send us a letter from time to time.

ON the 12th, says the *Arizona Star*, Hon. J. K. Luttrell closed the largest mining transaction yet negotiated in Arizona, the trade was made for Eastern parties. The mines purchased were the Belmont, consideration \$250,000; San Antonio, \$50,000 and the Washington pool, \$200,000. The two former properties were owned by H. D. Bacon, of S. F., and an old and true Arizonian, Thomas Yerkes. The owners of the Washington pool are all hard-fisted miners, and deserves every dollar they are receiving on their bonanza.

The Bechtel company, of Bodie, connected with the Bodie tunnel on the 14th inst., and half the size of the tunnel came under their shaft, so they fell directly into it. Everything is harmonious with both companies. It is of great value to both sides, giving good ventilation and making a very cheap way of putting ore to the mills in that canyon, thereby facilitating further workings to a very low figure.

THE Fulton Iron Works are employing from 275 to 300 men and are working to full capacity.

Properties of Silver.

We have received this week a neatly bound little book containing silver and gold tables as used by the New York Metallurgical Works, of 104 and 106 Washington St., N. Y. It was sent us by Mathey, Kustel & Riette, mining engineers and metallurgists, a branch house of the one in San Francisco on the corner of Pine and Leidesdorff. The book bears the "ear marks" of our friend, Mr. Riette, and is useful particularly to assayers. A couple of pages are devoted to the "Properties of Silver," and this we copy as follows:

Silver has been known from the earliest ages; coin of that metal has been found dating back to 800 B. C., and in the pyramids of Egypt linen stained black by salts of silver has been discovered.

The alchemists called it Luna or Diana, and we still call the fused nitrate of silver lunar caustic. The Latin name for it was argentum, from which we derive the term argentiferous and the chemical symbol Ag.

Silver is very ductile and the best conductor of heat of all the metals; its atomic weight is 108; its specific gravity varies from 10.43 to 10.56, according to whether it be cast, hammered, drawn, etc. It fuses at about 1,832° F. (which is lower than the melting point of gold or of copper) and can be volatilized by the oxygen-hydrogen flame. In melting it absorbs oxygen from the air, which it gives off again on cooling, causing the molten mass to spit when suddenly cooled. (Only pure silver acts thus.)

Pure silver may be obtained crystallized in cubes and octahedrons. It dissolves in nitric acid of medium concentration; concentrated sulphuric acid changes it into sulphate of silver at a boiling heat, while muriatic acid does not act upon it. Quicksilver unites with it, forming an amalgam, and it is easily alloyed with many other metals during fusion.

The characteristic test for silver in (acid) solution is made by adding muriatic acid or a soluble chloride, when a white, curdy precipitate of chloride of silver is formed, insoluble in water or in acids, but soluble in ammonia (also in cyanide of potassium or hyposulphite of soda); from the ammoniacal solution acids reprecipitate the chloride of silver. Very dilute solutions of silver are rendered opalescent on applying this test.

All compounds of silver yield metallic silver when fused with carbonate of soda before the blowpipe.

Caustic soda or potassa precipitates silver from its solution as grayish-brown oxide of S., insoluble in an excess of the precipitant, soluble in nitric or sulphuric acid.

Ammonia produces the same precipitate, soluble in an excess of the precipitant and in nitric or sulphuric acid.

Carbonated alkalies produce a precipitate of yellowish-white carbonates of silver soluble in carbonate of ammonia and in nitric and sulphuric acid.

Sulphureted hydrogen and sulphide of ammonium produce a black precipitate of sulphide of silver, which is decomposed by boiling nitric acid with elimination of sulphur.

Copper, zinc and other easily oxidized metals precipitate metallic silver as a gray, spongy powder, and some organic substances act in a similar manner.

Silver is found in its native state, alloyed with gold, and as sulphide of silver, frequently with copper glance, galena and other metallic sulphides, less frequently as chloride of silver (horn silver) and rarely as iodide or bromide of silver.

The water of the oceans contains traces of silver.

A NEAT JOB.—In repairing the Atlas furnace and fixing for a run of ore, says the *Eureka Sentinel*, it was discovered that the stove smoke-stack had sprung so much as to lean dangerously down hill toward the dump. It was at least 18 inches out of plumb, and Henry Allen, of the Eureka Co., was called upon to make the repairs. Allen was busy, so he sent up Jake Berge, who righted the immense tower of stone by simply cutting away on the upper side a slice of the rock near his base. She now stands as true as ever. It was a very nice piece of workmanship, and Mr. Berge deserves the mention due skilled labor.

THE case of the South Mountain Consolidation mining company in bankruptcy was on hearing before Judge Hoffman of the U. S. District Court last Friday. The hearing is on application of the creditors for the levy of an assessment to pay the debts of the bankrupt corporation, amounting to between \$400,000 and \$500,000. The case involves the power of a U. S. Bankruptcy Court to levy an assessment on the stock of a bankrupt corporation to pay its debts.

A LOT of miners at the Monterichard mine, Alameda county, "struck" and quit work the other day on account of the employment of a Chinese cook at this boarding house. The boarding house is not connected with the mine, but it seems to be a rule of the Superintendent that the miners shall board at the regular boarding houses.

A DIVIDEND of 25 cents a share, or \$25,000, was paid by the Silver King mine, Friday, the first in some time.

The Green Mountain Mill and Mine.

At the Crescent during the past six months, says the *Plumas National*, much of the old time activity of that once busy camp has been renewed. This is principally owing to the extensive improvements of the Green Mountain company. The extent of work done during the past summer shows well for the management, and now that the new 60-stamp mill is about completed, we can speak of the work more in detail. Thirty-two stamps have been running on this mine the past three years. For two years the company has been pushing work to open the ledge in No. 5 tunnel. This tunnel has been running on the vein about 900 ft., and is now over 2,000 ft. in length. It has opened two fine pay chimneys of ore, and the face is within some 80 ft. of the main pay body that was worked in No. 4 tunnel. This ore body is greater, both as to length on the vein and extent of backs, than any other mine in the county; and few in the State can equal it. The second pay chimney through which the company is now raising from No. 5, shows the ledge to be 12 ft. wide, and gives 400 ft. of backs to No. 4, and from that point to the surface is 350 ft. additional, making 750 ft. of standing ore. The quality of gold in the chimney is \$17.52 per ounce, a very fine showing for quartz gold.

As depth is gained on the main pay body of this mine, every level shows that the vein is increasing in width. In the No. 4 the vein was 80 ft. wide from wall to wall, and a greater width is expected in No. 5. This mine has produced in the last 10 years a large amount of bullion, with a very limited crushing capacity, over three quarters of a million dollars before the purchase by the present owners in June, 1879, since which time the developments have been on a more extensive scale, and have given the splendid results herein mentioned. Prof. W. P. Black, of New York, the eminent expert and mining engineer who made a thorough examination of the mine last winter, has just completed his second examination, and fully confirms his former high opinion of the permanency and great value of this property, and showing the resources to be years ahead of the increased milling facilities. Another valuable adjunct is the extensive water privileges, and the cheapness with which the ore can be handled. No mine in the State can make a better showing. The ore all falls from stopes, is handled through chutes, and, we are informed, can be delivered in the mill and crushed at an average cost of \$2 per ton.

This fine development with such large reserves of ore encouraged the energetic President of the company, Mr. H. C. Bidwell, to complete arrangements the past spring for the erection of 60 stamps additional on the property. With one exception this is the largest gold quartz mill in the State, and has involved an expenditure of some \$60,000. In a short time the company will have 92 stamps running. The mill is situated at the foot of the mountain, a short distance below No. 6 tunnel, which will give some 400 ft. still greater depth on the mine. The mill building to the tramway is 148 ft. long and 72 ft. in width, complete in all its appointments. The plans were drawn by Mr. Wm. Manson, of the Greenville Iron Works, and it has been erected under the supervision of Mr. Enos Burns, a master mechanic. There are 12 batteries of 5 stamps each, and self ore feeders to each battery. The stamps are about 800 lbs. weight; the aprons are 8 ft. long and width of the mortar. The plates are all silvered, all silver plates also extend down the sluice boxes. The ore is entirely free milling, and the amalgamation is done in the mortars and on the plates. The driving pulley is 12 ft. in diameter, and the belt 36 inches wide, of 5-ply rubber. All the modern improvements in quartz mill building is combined in this work. The power will be furnished by a 6-ft. diameter Knight water wheel, under 400 ft. pressure, through 11-inch heavy iron pipes. The tramway, by which the ore is delivered to the mill, is a substantial and complete work. It is 900 ft. in length, the upper and lower ends being supported by strong trestle work, and in the center for some 300 ft. the ties being laid on the ground. This track is double, and the cars run by wire cable direct into the mill, the track extending the entire length of the dump, whereby the ore can be delivered at any point. No rock breaker is necessary in this mill, the rock going direct to the ore feeders. The mill dump has a capacity of 1,000 tons of ore, and the mine dump from which the cars are loaded, about 800 tons. The company own 3 contiguous claims, 4,350 ft. in length on the vein, also a large timber tract, all held under United States patent. The fine, new and well conducted hoarding-house, company's office, superintendent's house, store-house and miners' cabins are all in neat order, and form quite a settlement. In all, it is one of the most promising and best managed mines in the State, and we are glad to record its success.

THE Schenectady Locomotive Works are building a large locomotive for the New York Central road, to be called the "Wm. H. Vanderbilt." The front end is to be mounted on 33-inch paper wheels, the first instance we believe, of truck wheels of this size being used under an engine, except in a case of the "Uncle Dick," on the Atchison, Topeka & Santa Fe road. The ordinary sizes of engine truck wheels are 26 and 28 inches and latterly 30 inches.

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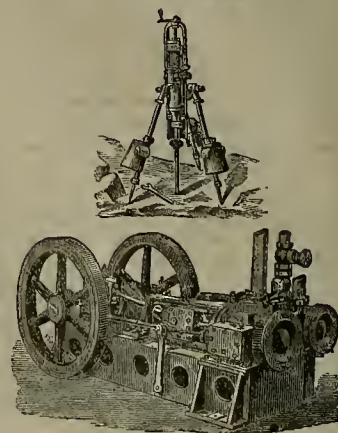
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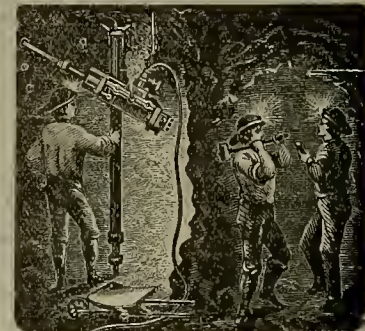


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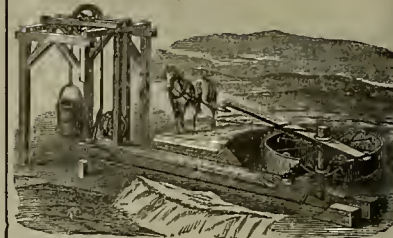
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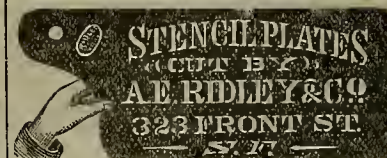
Believing that a journal of its kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, S. H. Williams, Thos. J. Welsh, P. Huern, John Marquis, B. McDougal & Son, Wm. Mosser, Wm. Curlett, Meeker & Banks, W. O. Hoagland, S. & J. Newson, B. Henriksen

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Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

COMMISSIONER'S DECISIONS.
Huntley et al. vs. Smith.

Middlings Purifier. Appeal from the decision of the Examiner of Interferences, denying motion for award of priority of invention upon the record under Rule 107. Decided September 22d, 1880. Marble, Commissioner.

1. When the party last filed in the office does not in his preliminary statement allege a conception of the invention in controversy, earlier than the record date of the party first to file his application, it does not overcome the *prima facie* case made by the date of application, and judgment on the record should be rendered against him.

2. The mere fact that an earlier application was made by the party disclosing the invention in dispute cannot avail to give a *prima facie* date of invention in this proceeding, unless there is some reference in the later application which seems to connect it with the former.

3. While the filing of an application does not prove reduction to practice, it establishes the fact of invention.

4. Applications diligently prosecuted evince a faith on the part of the inventor, equal to that which would follow from a reduction of this same to practical form, and the latter is not a condition called for in the statutes.

5. In cases of long delay to prosecute the invention beyond mere description, either by applying for a patent or by a reduction to practical form adapted to use, the question of abandoned experiment or conception will rise and should be considered a factor in the case.

The decision of the Examiner is reversed.

DECISIONS OF THE U. S. COURTS.

Rogers vs. Beecher, et al.

U. S. Circuit Court, Northern District of New York. Decided September 16th, 1880. Wallace, J.

1. A patentee is entitled to the presumption of priority which his patent affords, and this presumption is only overcome by clear and satisfactory proof to the contrary.

2. The plaintiff is obliged in order to recover damages to prove affirmatively that the defendants have employed the invention patented, and having in this case failed to do so satisfactorily, the bill was dismissed.

Hoffman vs. Young.

U. S. Circuit Court, Eastern District of Pennsylvania. Decided April 23th, 1880. Butler, J.

1. A mere aggregation of old parts without any new result issuing from their united action is not patentable.

2. Old parts to be patentable must combine in operation and by their joint effort produce a new result. They need not act simultaneously, but it so arranged that the successive action of each contributes to produce the result, which, when obtained, is the product of all the parts viewed as a whole, a claim for this combination may be sustained.

3. No rule of universal application has been laid down defining a patentable combination, but two things are always necessary: first, a novel assemblage of parts exhibiting invention; second, the co-operation of parts in producing a new result.

4. By the term "co-operation" the Courts do not mean merely acting together or simultaneously, but united to a common end—a unitary result.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

MACHINE FOR MAKING PAPER PULP FROM WOOD.—Rufus B. Lans, Stockton, Cal. Patented Oct. 12, 1880. No. 233,105. This invention relates to an improved machine for making a pulp from wooden blocks which can be used for paper-making; and it consists in the employment of a series of hard metal pins, which are placed in rows in such a manner, that two or more rows will make a continuous cut. The pins project from a surface or groove, which is suppressed below the general level of the disc or cylinder which carries them, said pins being adapted to scrape off the fibers of the wood in small particles or pulp, while the depression allows the pulp to be carried away from the cutting-face of the pins as fast as produced.

GRAIN MEASURE AND REGISTER.—Charles S. Ball, Amador, Cal. Patented Oct. 12, 1880. No. 233,136. This device consists in certain details of construction and combination of parts, whereby the grain from the separator is measured, and the amount that passes through the measure is registered, and afterwards passed to the sack in the sack-holders. In this way the grain is measured accurately, and the amount thrashed is registered. The measure may be used for any purpose, such as measuring grain in ships loaded in bulk, in warehouses, etc.

ORE CRUSHER.—G. F. E. Brinckmann, Oakland, Cal. Patented Oct. 12, 1880. No. 233,139. This machine answers the purpose of both crusher and pulverizer in one, taking quartz in pieces as large as those received by an ordinary rock breaker and discharging it as fine as is necessary. The crushing and pulverizing in this machine is done entirely by rollers, the ore being crushed either wet or dry. By changing these rollers once in 24 hours a uniform wear upon the whole device is maintained.

STOCK CAR.—Lyman Woodruff, Ellensburg, Org. Patented Oct. 12, 1880. No. 233,129. This object of this car is provide a series of stalls in which live stock may be transported on cars or vessels and fed and watered by this way. It consists in certain details of construction whereby the stalls can be taken apart and set up at will, and he accommodated to suit the space at disposal.

In the recent communication of J. W. A. W., entitled "Miners' Peak," for "Smidway Peak" read "Sunday," and "Glenville" for "Greenville."

The Eureka Consolidated Mine.

The Eureka Con. mine at Eureka, Nev., is a mine with a good record. With the exception of a very important law suit some time since, everything has gone on smoothly with this company since it started. It has made a good many men rich, and not being a "stock deal," has not made any poor. The mine has always had ore, and has paid regular dividends, amounting in the aggregate to four and a half million dollars.

The annual meeting was held this week, and the Secretary made the following statement for the past year:

RECEIPTS.	
Product refined bullion.....	\$1,659,925
Sales lead.....	707,593
Sales sundry supplies.....	1,203
Advances on shipments.....	1,027,255
Superintendent's drafts (outstanding).....	1,922
Bills for supplies (not due).....	850
H. Donnelly, Supt., Oct. 11, 1879.....	143
Cash on hand Oct. 11, 1879.....	9,157
Total.....	\$3,399,053
DISBURSEMENTS.	
For mine account.....	\$ 374,473
Smelting.....	423,134
General expense.....	24,726
Expense, San Francisco.....	11,673
New shaft.....	35,316
Freight, raising, etc.....	423,547
Interest.....	4,038
Legal expense.....	11,146
Advances on shipments.....	1,408,078
Dividends Nos. 48 to 59 inclusive.....	380,000
K. R. property.....	200,000
Supt's drafts (carried over from last year).....	12,635
Personal accounts (carried over from last year).....	869
H. Donnelly, Supt., Oct. 9, 1880.....	97
Cash on hand Oct. 9, 1880.....	24,521
Total.....	\$3,399,053

The mine came to the front as a dividend payer about 10 years ago. The capital stock has been \$5,000,000 in 50,000 shares from the start. The only money paid in on account of capital consisted of two assessments of \$1 per share each, the last of which was levied in May, 1876. With this paid in capital of \$100,000 the mine has produced many thousand tons of gold, silver and lead, which has netted many million dollars. There have been 60 dividends paid, ranging from 50 cents to \$3 per share. No dividends were paid in 1872 or 1876. It was in 1876, we believe, that the mine was in litigation. The \$100,000 paid in by the stockholders has resulted in their receiving back in dividends the sum of \$4,405,000. Appended will be found a list of the dividends paid during each year up to and including the ones for Oct. 21st, 1880:

Year.	DIVIDENDS.	No.	Amount.
1871.....	6	\$275,000
1873.....	4	200,000
1874.....	4	175,000
1875.....	8	300,000
1877.....	4	600,000
1878.....	12	1,800,000
1879.....	12	800,000
1880.....	10	230,000
Totals.....	60		\$4,405,000

Mining in River Beds.

We see by a Montana paper that an "old California miner" has a dredging machine similar to those used in mining river beds in California, and proposes at an early day to erect the machine in the bed of the Missouri river, near Edmonston's Ferry, for the purpose of prospecting and mining. The *Independent* says further: "It has long been believed that the beds of the Missouri and other large rivers in Montana contained rich deposits, perhaps richer than any mines heretofore opened in the Territory. Mr. Lissner now proposes to test that question. His machinery is ample for the purpose. We understand that the tube is capable of lifting from 300 to 400 tons of dirt in 10 hours. The dirt is taken from the bed of the stream by what is known as the 'vacuum process' and then washed in a boat."

We do not like to discourage anyone, but we are inclined to believe that this "vacuum process" has more effect on the pockets of the inventor than on the gravel. It will go down to bedrock in one way; and will find the bottom of a pocket in a pair of breeches better than a pocket in the bottom of a river. In other words it is "no go."

The machines which have been tried—not used—in California rivers, have never accomplished anything. Of all the kinds of dredges tested, the vacuum dredges have been the greatest failures. They make a big noise, take a great deal of steam and coal, pump up some water and mud, and a little gold. They have been tried in many places, and always with the same discouraging result. There are 3 or 4 of these "mining boats" laid up in the river mud that could be bought cheap.

This first attempt at this kind of mining was made some eight or ten years ago on the ocean beaches off Gold Bluffs, on the northern coast. Pumps were rigged which were to draw up the sand and gold from the bottom of the ocean. This was tried several times, but in each case a failure was the result.

A few years ago several "mining boats," or dredgers, were built for work up in the Feather river. Several different plans were tried, but each proved a failure. Every now and then some one, ignoring the experience of others, starts up a scheme for getting gold out of river

bottoms. We have never been able to chronicle a success in a single instance. Some little gold is taken up to be sure. The writer has a friend who carries a pocket piece, a little two-ounce nugget brought up by a vacuum dredger from a river bottom. It cost him several thousand dollars, however. If gold can be taken out of the Missouri and other large rivers in Montana by any such means, then the managers of the scheme can come to California and make some money in showing us how to do it.

News in Brief.

THERE was a heavy frost in Virginia on Monday night.

RUSSIA has ordered a survey of the entire coast of Corea.

THE Turks are concentrating a large number of troops in Smyrna.

TRAINS have been blocked in western New York by ice and snow.

TEN THOUSAND Chinamen are about to leave Cuba for New Orleans.

THERE is a breach between the priesthood and the Irish Land League.

GERMANY is considering the question of reducing the duty on grain.

THE Canadian Pacific railroad is being pushed forward with great energy.

SEVERAL vessels were lost during the recent storm on Lakes Michigan.

DON CARDILLO BARERO, President of the Republic of Paraguay, is dead.

A deadly cattle plague has broken out in Eastern Washington Territory.

Nor the slightest sign is yet made at Constantinople of ceding Dulcigno.

THE snowstorm in Iowa, Nebraska and Dakota has caused the loss of much stock.

HARTMANN, the Nihilist, asserts that there are 13,000,000 organized radicals in Russia.

AFFAIRS in Colorado still have an ugly look, and a conflict with the Utes seems imminent.

A REPORT has reached Berlin that the Czar intends to abdicate in favor of the Czarowitz.

THE leaders of the Land League in Ireland are to be prosecuted by the British government.

THE Emperor and Empress of Germany were enthusiastically welcomed at Cologne on Saturday.

FIVE steamers are to be built on the Clyde for the new French company to trade with the United States.

WHILE traveling in the stage from Bodie to Carson, one of the passengers shot another for crowding him.

BERRY, the Indian Agent, who escaped from the Sheriff, is in the Indian camp and protected by them.

R. R. PARKISON, the well known Nevada newspaper man, was robbed by a footpad Thursday night.

OWING to a belief that the government intends to prosecute the agitators, a lull has occurred in the Irish agitation.

On the 9th, the Emperor of Russia was married to the Princess Dolgorenski in the chapel of the Imperial Palace.

THE Secretary of the Interior has taken active measures to avert from Colorado the calamities of an Indian war.

THE Bonapartists have united on Prince Victor Napoleon as heir to the throne, to the exclusion of his father.

BYRON BLAKE, a madman, murdered his mother, sister and stepfather and then hanged himself, in Wheelock, Vt.

FIVE million salmon eggs from California have arrived at Chicago, for distribution among the different Fish Commissions.

THE Western Railroads are fighting among themselves, and it is thought the fight will involve all the Eastern branches.

JOHN A. WOODWARD, Cashier in the Treasury Department, has disappeared from Boston with \$82,000 of funds not his own.

TWENTY-NINE missionaries from Salt Lake arrived in New York on their way to Europe, in the interest of the Mormon faith.

THE negotiations between China and Japan in regard to the Loochoo question have now entered a phase promising peaceful solution.

THE Italian laborers on the Cape Cod canal have taken possession of Sandwich, Mass. Police have been sent to the town to restore order.

THE Porte requested the Ambassadors to conciliate the Albanians with money and decorations. The Chief of the Albanian League has been raised to the rank of Pasha.

THERE is great alarm among the managers of all the roads over the unpromising outlook, and dividends will be few and low. Fars have been reduced from Chicago to St. Louis from \$14.80 to \$6.

A BILL has been submitted to the Mexican Congress that churches and curacies now under the charge of foreign priests shall be restored to the dominion of the nation. This is a blow aimed at the Jesuits.

IT is positively known that Austria, Germany and France have resolved to hold aloof from Gladstone's coercive measures. A deepening dislike and distrust of Gladstone is beginning to be displayed throughout Germany.

AT Port Benton, Montana (elevation 2,754 ft.), the average temperature is about 42°; at Virginia City (elevation 5,286 ft.), about 40°; at Deer Lodge (elevation 4,768 ft.), about 42°; and at Fort Owen (elevation 3,284 ft.), 47°.

COLONEL W. B. THOMPSON, superintendent of this railway mail service, in his annual report, recommends an increase of \$100,000 in the appropriation for the postal car service, of \$50,000 for route agents, and \$75,000 for mail route messengers.

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Advancing years, care, sickness, disappointment, and hereditary predisposition—all operate to turn the hair gray, and either of them incline it to shed prematurely. AYER'S HAIR VIGOR will restore faded or gray, light or red hair to a rich brown or deep black, as may be desired. It softens and cleanses the scalp, giving it a healthy action. It removes and cures dandruff and bunions. By its use falling hair is checked, and a new growth will be produced in all cases where the follicles are not destroyed or the glands decayed. Its effects are beautifully shown on brassy, weak, or sickly hair, on which a few applications will produce the gloss and freshness of youth. Harmless and sure in its operation, it is incomparable as a dressing, and is especially valued for the soft luster and richness of tone it imparts. It contains neither oil nor dye, and will not soil or color white cambric; yet it lasts long on the hair, and keeps it fresh and vigorous.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

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Choice, lb.....	25 @ 1
Cheese.....	15 @ 25
Eastern.....	25 @ 30
Lard, Cal.....	15 @ 25
Eastern.....	20 @ 25
Flour, ex fam. hbls	10 @ 20
Corn Meal, D.....	2 @ 3
Sugar, wh. orshd	12 @ 13
Light Brown.....	8 @ 9
Coffee, Green.....	25 @ 35
Tea, Fine Black.....	50 @ 100
Finest Japan.....	55 @ 100
Candles, Adm'te.....	15 @ 25
Sisal Pap.....	7 @ 10
Rice.....	8 @ 1
Yeast.....	1 50 @ 20
Oat'd Oysters doz	20 @ 50
Syrup, S F Gold'n	75 @ 100
Dried Apples, lb.....	10 @ 14
Fig, Cal.....	9 @ 15
Peaches.....	11 @ 10
Oil, Kerosene.....	50 @ 60
Wine, Old Port.....	3 50 @ 60
French Claret.....	1 00 @ 20
Oat, doz hot.....	3 00 @ 40
Whisky, O K, gal.....	5 00 @ 60
French Brandy.....	4 00 @ 60

METALS.	
(WHOLESALE.)	
WEDNESDAY M., Oct. 13, 1880.	
IRON.	
American Pig, soft, ton.....	32 @ 33 00
Scotch Pig, ton.....	25 @ 27 00
American White Pig, ton.....	25 @ 27 00
Oregon Pig, ton.....	25 @ 27 00
Refined Bar, ton.....	41 @ 42 81
Horse Shoe, ton.....	7 @ 8 00
Nail Rod, ton.....	8 @ 9 00
Norway, according to thickness.....	8 @ 9 00
STEEL.	
English Cast, B.....	16 @ 16 16
Black Diamond, ordinary sizes.....	13 @ 15 13
Drill.....	9 @ 10 9
Flat Bar.....	9 @ 10 9
Flaw Steel.....	9 @ 10 9
COAL.	
Ingot.....	4 @ 52
Sheet.....	4 @ 20
Sheathing, Tinned 14x48.....	4 @ 42
Nails.....	38 @ 42
Boils.....	38 @ 42
Old.....	4 @ 16
Bar.....	4 @ 22
Recipitate, 100 lbs.....	13 @ 19
LEAD.	
Pig.....	4 @ 5
Bar.....	4 @ 6
Pipe.....	4 @ 6
Sheet.....	4 @ 6
Shut, Discount 10% on 500 Bags.....	4 @ 3
Drop, per bag.....	2 @ 10
Huck.....	2 @ 30
Chilled " ".....	2 @ 50
TIN PLATES.	
10x14 O Charcoal.....	10 @ 10 50
10x14 C Coke.....	10 @ 10 00
Banca Tin.....	10 @ 25 00
Australia.....	10 @ 20 00
I. C. Charcoal, Roofing 14x20.....	21 @ 22 00
I. C. Charcoal, Roofing 14x20.....	21 @ 22 00
ZINC.	
By the Osk.....	1 @ 10
Zinc Sheet 7x3 ft. 7 to 10, D. less than cast.....	10 @ 11
NAILS.	
Assorted sizes.....	4 @ 24 75

LEATHER.	
(WHOLESALE.)	
WEDNESDAY M., Oct. 13, 1880.	
Sole Leather, heavy, lb.....	30 @ 32
Light.....	33 @ 25
Jodot, 8 to 10 Kil, doz.....	36 @ 46 00
11 to 13 Kil.....	50 @ 55 00
14 to 15 Kil.....	65 @ 72 00
Second Choices, 11 to 16 Kil.....	40 @ 65 00
Simon Ulmo, Females, 12 to 13 Kil.....	62 @ 65 00
14 to 15 Kil.....	61 @ 65 00
16 to 17 Kil.....	67 @ 70 00
Simon, 18 Kil.....	61 @ 64 00
20 Kil.....	65 @ 65 00
24 Kil.....	70 @ 73 00
Kips, French, lb.....	1 @ 1 37
Cal. doz.....	46 @ 54 00
French Sheep, all colors.....	12 @ 15 00
Eastern Calf for Backs, lb.....	1 @ 1 25
Sheep Roans for Topping, all colors, doz.....	9 @ 10 00
For Linings.....	6 @ 10 00
Cal. Russet Sheep Linings.....	3 @ 5 50
Best French, French, lb.....	4 @ 5 00
Good French Calf.....	4 @ 4 00
Best Jodot Calf.....	4 @ 5 25
Leather, Harness, lb.....	35 @ 40
Leather, doz.....	45 @ 60 00
Skirting, lb.....	33 @ 37
Welt, doz.....	30 @ 36 00
Buff, ft.....	17 @ 20
Wax Side.....	19 @ 20

LUMBER.	
WEDNESDAY M., Oct. 20, 1880.	
PINE AND REDWOOD.	
Flooring & Step, No. 1. 30 00	
OARGO RATES.	
PINE.....	16 00
Rough.....	16 00
Flooring & Step, No. 2. 24 00	
REDWOOD.....	27 00
Rough.....	16 00
Surfaced.....	23 00
RETAIL RATES.	
PINE.....	20 00
Rough.....	20 00

Signal Service Meteorological Report.	
SAN FRANCISCO.—Week ending Oct. 19, 1880.	
HIGHEST AND LOWEST BAROMETER.	
Oct. 13, Oct. 14, Oct. 15, Oct. 16, Oct. 17, Oct. 18, Oct. 19	
30.264, 30.207, 30.118, 30.201, 30.118, 30.050, 30.083	
30.162, 30.051, 30.059, 30.113, 30.005, 29.992, 30.024	
MAXIMUM AND MINIMUM THERMOMETER.	
64, 69, 74, 77, 77, 75, 78	
51.5, 61, 54, 57, 56, 57, 58	
MEAN DAILY HUMIDITY.	
77, 65, 40.7, 39.7, 41, 38.7, 60.7	
PREVAILING WIND.	
W, NE, NE, N, N, NW, N	
145, 197, 134, 121, 35, 127, 126	
STATE OF WEATHER.	
Clear, Fair, Clear, Clear, Clear, Clear, Clear	
RAINFALL IN TWENTY-FOUR HOURS.	
.05	
Total rain during the season, from July 1, 1880, 00.05 in.	

Gold, Legal Tenders, Exchange, Etc.	
[Corrected Weekly by SUTRO & Co.]	
SAN FRANCISCO, Oct. 20 3 P. M.	
SILVER.....	
GOLD BARS, 890@910. SILVER BARS, 10@18 @ cent. discount.	
EXCHANGE on New York, 17 1/2 @ 20, on London bankers, 49 1/2 @ 49.	
Consular, 50; Paris, 5 francs @ dollar; Mexican dollars, 91@93.	
LONDON Consols, 98 15-16; Bonds (4 1/2), 112 1/2.	
QUICKSILVER in R. F., by the flask, 30 42 1/2 @ 45. lb.	

Amusements.

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CHAR. H. GOODWIN.....Treasurer.
J. P. CHAPMAN.....Assistant Treasurer.

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Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

NOTICE I

Annual Meeting of Stockholders for the Election of Directors

Notice is hereby given that a meeting of the Stockholders of the North Noonday Mining Company will be held, in accordance with the By-Laws of said Company, at the office of said Company, Room 25, No. 310 Pine Street, San Francisco California, on Tuesday, the Second (2d) day of November, A. D. 1880, at one o'clock P. M., of said day, for the annual election of Directors, and the transaction of such other business as may properly come before the meeting. Transfer books will be closed on Friday, the Twenty-ninth (29) day of October, 1880, at three o'clock P. M.

W. M. J. TAYLOR, Secretary North Noonday Mining Company. Office—Room 25, No. 310 Pine Street, San Francisco, California.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company, SAN FRANCISCO, CAL., OCTOBER 9, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Thirty-six (36), of Fifty (50) Cents per share, was declared, payable on Friday, October Fifteenth (15), 1880. Transfer books closed on Tuesday, October Twelfth (12), 1880, at 3 o'clock P. M.

W. M. WILLIS, Secretary. Office—Room 20, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company. Nevada Block, Room 37, San Francisco, October Fifteenth (15), 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 60) of Fifty (50) Cents per share was declared, payable on Wednesday, the Twentieth (20) day of October, 1880. Transfer books closed until the Twenty-first (21) instant.

W. W. TRAYLOR, Secretary.

Lewis Consolidated Silver Mining Company.—Location of principal place of business, San Francisco. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2d) day of October, 1880, an assessment, No. Three (3), of Ten (10) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 15, No. 310 Pine Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the First (1st) day of December, 1880, will be delinquent, and advertised for sale at public auction; and unless payment be made before, will be sold on Monday, the (20th) Twentieth day of December, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors

J. W. PEW, Secretary. Office—No. 310 Pine Street, Room 15, San Francisco, Cal.

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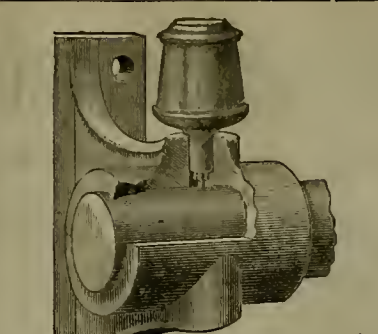
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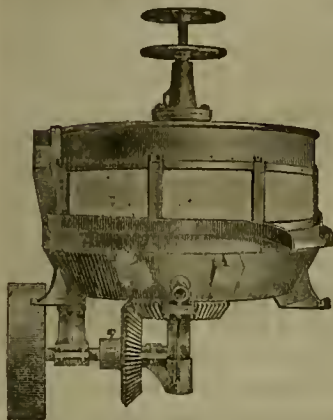
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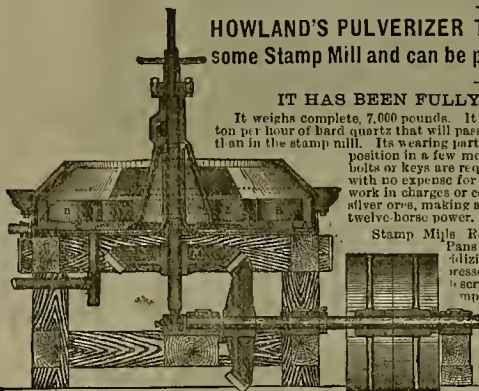
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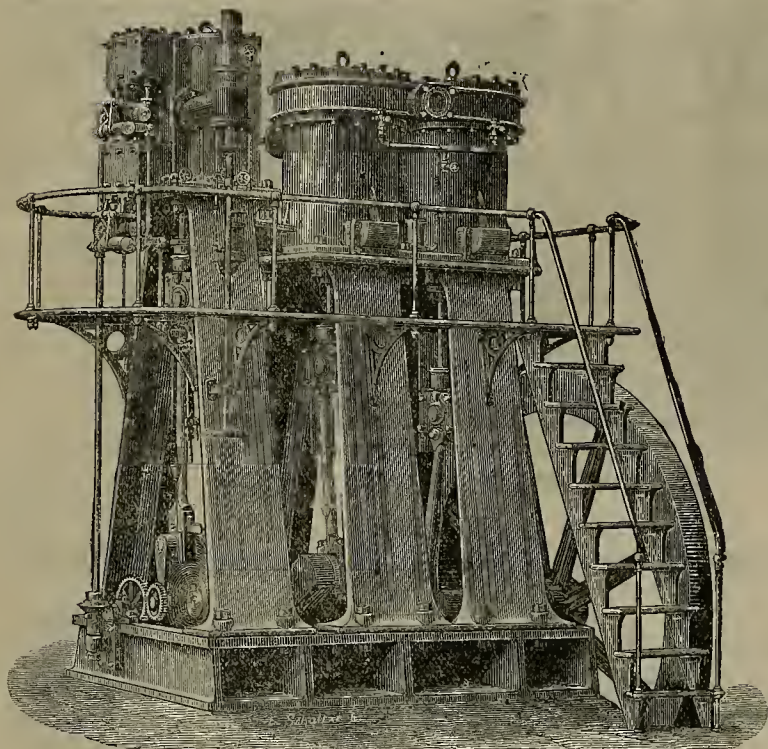
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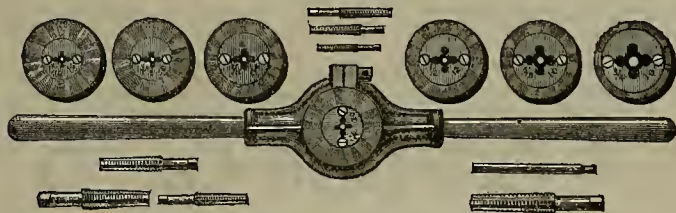
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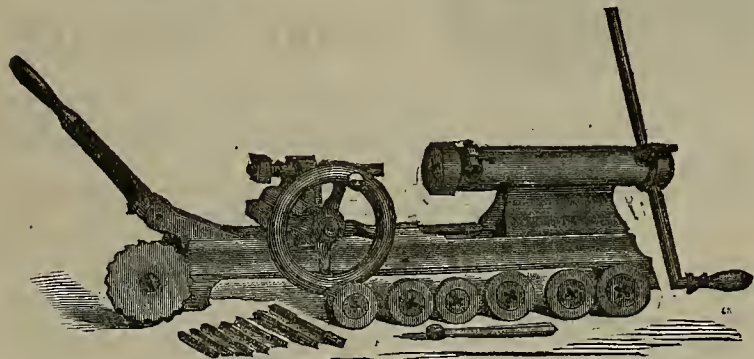
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SAN FRANCISCO, SATURDAY, OCTOBER 30, 1880.

VOLUME XLII
Number 18.

The Sherrill Gang Plow.

We illustrate on this page the Sherrill gang plow, a recently invented implement, which possesses many advantages, combining as it does several independent features in the one machine.

The plow has been specially constructed so as to ensure light draft. The line of draft strikes a little above the plow points, the draft bars being beneath the frame and axle, and directly attached to the diagonal cross bar to which the plow beams are connected. The independent motion of the plows, as hereinafter described, also tends to lighten the draft.

Each plow has an independent vertical movement, and naturally conforms to all inequalities of the ground, whether rolling or hillside, plowing all to uniform depth. On all planes its operation is the same, and performed automatically without adjustments or delays.

Below and in the rear of the axle is hung a diagonal cross-bar, to which the forward extremities of the plow beams are hinged, and which is adapted to move the plows collectively to or from the land by means of levers and connecting mechanism adapted to vary and maintain the cross-bar in any desired vertical adjustment. By moving the lever, therefore, and swinging the cross-bar, the whole gang of plows are moved to or from the land side more or less, as desired, and this without stopping the team or altering any of the parts. In order to allow of this motion, a second diagonal cross-bar, above and to the rear of the other, is employed, and to this the rear-arched portions of the plow beams are loosely connected by links, as shown in the engraving. This admits of the plows having a free vibratory movement in a lateral direction.

A lever is connected with this rear cross bar, and another with the front cross bar, the two being united to a third lever, as shown, thus admitting of simultaneous adjustment of the plows to or from the ground without altering the draft or interfering with the independent motion of the plows. The depth of cut is thus regulated, and the whole mechanism of the plows raised or lowered with respect to the frame, which itself always remains the same.

The plow beams, made of iron, are bifurcated at their rear ends; that is, they are split so that the wrought-iron standard of the plow comes between them. Each plow standard is pivoted by a bolt to its respective beam, coming between the two parts of said beam. The extended end of each standard is held by a clamp, so the standard is adjusted with relation to the beam. By the plow standard being thus clamped, the points of the plows can all be regulated to the same height, so any one plow can be prevented from "scraping" or dragging, a frequent fault in gangs. The plows are thus adjusted so they are perfectly natural and level on the bottom of the furrow.

The driver has no occasion, when plowing, to leave his seat to handle any lever. They are so easily handled that any boy can use them. The lever shown in the engraving in front of the seed box is not now placed there, the latest plows having this lever put nearer the driver's seat.

This plow is so constructed as to form three implements in one. Each gang has two sets of plows, one of five 8-inch plows, and another of four 10-inch plows, set to cut 40 inches wide. One of these sets is for deep plowing and the other for crossing summer fallow or plowing in seed. There is also a seeder, as shown in the engraving. Thus the implement is a seeder, cultivator and plow. In the seeder are peculiar agitators, which rotate and keep the holes clear so they cannot become clogged with straw. The size of the holes is regulated so any sized grain will go through. A peculiar wheel is used on this implement, all made of wrought iron—the rims, tires and spokes.

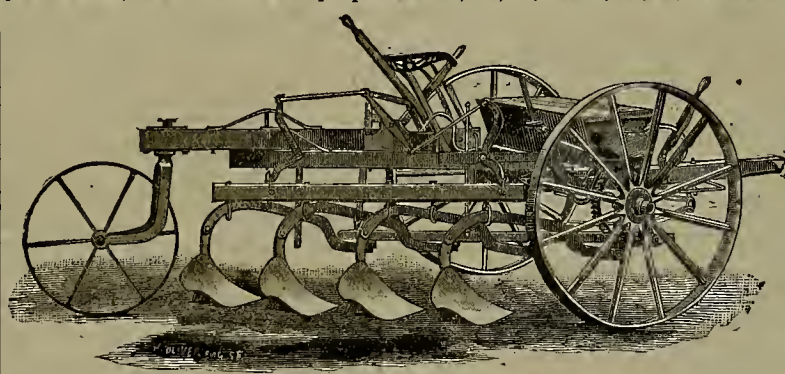
The plows can be raised or lowered by a simple and easy movement, while the plow is in motion and without checking the speed of the horses. The machine really forms a combined plow, cultivator and seeder. Its construction admits of its working on sidehill or level, and plowing to a uniform depth in rolling or uneven

ground. This is due to the independent action of the plows. Each plow works exactly the same as a single plow, and is independent of the motion of the others.

Dynamometer tests prove the lightness of the draft of the plow. It is so arranged that it is perfectly under the control of the plowman, and can be changed from deep to shallow plowing, or the plow thrown out of the ground, while the team is in motion, with the greatest ease. Each plow in the gang being independent and running on its own draft, allows it to readily conform to all inequalities of the ground, plowing uneven land to the same depth. The plows being hung below and independent of the frame, takes all strains from it and the wheels, and allows the wheels to impart to each plow a vibratory motion, enabling it to work through the ground with the least expense of the power, and do superior work. This plow is so arranged that the farmer can use four 10-inch plows for first plowing, and can readily change to five 8-inch plows crossing summer-fallow or plowing in grain.

We saw at the factory, Perry street, between Fourth and Fifth, in this city, the other day, a large machine carrying 12 8-inch plows, and arranged to cut eight ft. wide, with eight horses.

STRATIFIED CIVILIZATION. — Herbert H. Smith's "Brazil, the Amazons and the Coast" is the latest and the most trustworthy work probably on that country and its relations to the United States. Mr. Smith spent nearly four years in Brazil, and his account of the prospects



THE SHERRILL GANG PLOW, SEEDER AND CULTIVATOR.

of the American farmers on the Amazon is not encouraging. The export duties of the country are a great hindrance to its agricultural development. The great obstacle to social and political advancement is what Mr. Smith calls the stratification of society. "Our North American civilization," he says, "is not stratified any more than the ocean is. If men stay at the bottom it is by their own gravity and not by birth or station. The stratified condition never did hold in the United States; but South America imported it from Spain and Portugal, and has clung to it ever since as blindly as if it were an element of human progress."

An American missionary, Miss Norwood, of Swatow, has lately described how the size of the foot is reduced in Chinese women. It takes two years to form these "golden lilies," as the Chinese lady calls her delicate little feet. During the first year the pain is so intense that the sufferer can do nothing, and for about two years the foot aches continually, and is the seat of a pain which is like the pricking of sharp needles. With continuous rigorous binding, the foot in two years becomes dead and ceases to ache, and the whole leg, from the knee downward, becomes shrunk, so as to be little more than skin and bone.

SIR EDWARD DENNY is to make an interesting experiment on his Irish estates. He offers to grant leases forever to the occupying tenants on the Denny estates, and it is understood that the rents will be the same as those fixed in 1,829. It is expected that the tenants, who are generally in comfortable circumstances, will gladly avail themselves of this offer.

Statistics of the Public Lands.

In his annual report of the vast business of the General Land Office of the United States, Commissioner Williamson devotes large space to the important subject of reorganizing and increasing the present force of the department. From the statistical portion of the Commissioner's report, the *Railway World* has learned that there were surveyed during the fiscal year ending June 30, 1880, 15,699,253 acres of public lands and 652,151 acres of private land claims. This is an increase in the amount of public lands surveyed of 725,347 acres over that of last year. This great increase is attributed to the operation of the act of March 3d, 1879, which led to a great increase in the number of applications by private individuals for public surveys. Disposals of public lands during the year were made as follows: Cash entries, 850,740 acres; homestead entries, 6,045,570 acres; timber-culture entries, 2,193,184 acres; agricultural colleges, 1,280 acres; locations with military county land warrants, 88,522 acres; swamp lands patented to States, 3,757,888 acres; lands certified for railroad purposes, 157,375 acres. The area of public lands surveyed in the different States and Territories during the last year is as follows: Arizona, 308,521 acres; California, 3,792,630 acres; Colorado, 2,775,601; Dakota, 2,130,808; Idaho, 225,637; Louisiana, 80,504; Minnesota, 296,253; Montana, 302,413; Nebraska, 709,179; Nevada, 928,694; New Mexico,

Ferguson Gold Mine.

Some short time ago we drew attention to the new machinery built in this city for this mine. It was specially designed to meet the peculiar requirements of the mine, and to take full advantage of the splendid water power furnished by the Merced river which flows past the property and forms its southern boundary. A capacious ditch, capable of carrying about 900 miner's inches of water, a mile and a half long, conveys the stream to a turbine wheel, whence the motive power is carried by an endless steel wire rope to the two air compressors. These have each two double-acting air cylinders, and are so arranged that they can be worked jointly or separately; and as one of the compressors gives power enough for the ordinary requirements of the mine, any inconvenience, in case of accident, is provided against. The compressed air is conveyed from the receiver in iron pipes to the pair of horizontal engines placed near the Ferguson shaft, which is sunk, below the main tunnel, 1,000 ft. in the mountain. These engines operate the hoisting works, which, specially arranged for the position they have to occupy in the interior of the mine, are singularly compact and powerful, and admit of the brakeman discharging the quartz from the kibble into the cars, which convey it direct to the mill. The pumps in this shaft are also operated by compressed air, of which an ample supply is furnished for rock drills, and also for ventilating the more remote workings in the mine.

The whole works are very complete and efficient. The motive power for the entire machinery is supplied by the Merced river, which, even in the driest seasons, runs a stream far beyond any possible requirements of the mine. The mill stands about 1,000 ft. from the mouth of the main tunnel. It is run by an overshot water-wheel supplied from the same ditch as furnishes water for the turbine wheel. It was erected two years ago, and has been thoroughly adjusted during the time it was necessarily idle, owing to the erection of the new hoisting works. It is intended to add 10 more stamps in the spring, thus doubling its capacity. The bodies of ore already developed in the mine and standing ready for extraction, and the fact that in the lowest level larger reserves of quartz, of excellent quality, than any seen in the upper workings, have been passed through, call for this increase in the milling power. The lowest level has been carried nearly 700 ft. north and south of the shaft, passing through in its entire length an almost unbroken chert of ore. Now that the new hoisting works are at work, the sinking of the shaft will at once be proceeded with, and these extensive reserves opened out for systematic working.

Some of the ore from the Ferguson mine (like that of its neighbor, the Hite mine) is exceedingly rich. Some time ago a parcel of about 50 lbs. of quartz was sent down for sale for jeweler's purposes. Over \$1,200 were readily paid for it; and we have just seen at Prof. Price's laboratory a similar parcel, not so rich, but carrying very heavy gold, and worth many thousands of dollars per ton. The Ferguson mine is one of the best developed and equipped mines in Mariposa county. Of its permanency there would appear to be no question; and of its profitable character, the owners appear to be satisfied, if one may judge from the outlay to which they have gone in erecting so complete and efficient a system of machinery and works.

THE Russian Technical Commission has reported in favor of the adoption of the metric system within the empire, and the report has been received with favor, especially as it is recognized that some radical change is absolutely necessary. Most European countries have adopted the system, and as the majority have voted in its favor, it is thought that an Imperial order will soon issue rendering it compulsory at the expiration of a couple of years.

THE FLOW OF GOLD FROM EUROPE. — In an article referring to the recent heavy shipments of gold from Europe to the United States, the *Philadelphia Ledger* remarks: This sustained course of exchanges with Europe is a full vindication of those who claimed that the return of gold in 1879 had more than an exceptional significance, and means a general change in favor of this country. It is a grave question what the future consequences will be to the industries and finances of France and the German States, whose resources have seldom hitherto been drawn upon to go off the continent altogether. It is an easier task to restore disturbed balances occurring between the European States, than between them and a country so remote as ours.

It is noted as a singular evidence that the potter's art is behind the age in the matter of labor-saving machinery, that the records of the United States Patent Office show that less than fifty patents have been taken out for improvements connected with the manufacture of pottery, of which less than half the number apply to potters' machines.

The Mining Laws.

Result of the Convention of Surveyors-General.

Below we present the work of the late Surveyors-General Convention, which will be found of considerable interest to our readers, particularly to the mining classes. The report is nearly complete, but the parts which are of interest only to certain localities have been omitted, such as provisions respecting surveys on swamp and overflowed lands and the like. Following is the report as adopted:

Mr. President: Your committee appointed to make suggestions to this convention has taken under consideration the "act to provide for the survey and disposal of public lands of the United States," submitted to the Congress of the United States by the Public Land Commissioners, beg leave to submit the following report in regard thereto, as suggestions for the action of this convention.

Amend Sec. 29 so as to provide that the Commissioner of the General Land Office shall have only the supervisory control of all surveys by general instructions, leaving all matters of detail and local administration to the Surveyor-General.

Amend Sec. 31 so as to read as follows: Copies of maps of survey on file in the General Land Office shall be made by the automatic system under the direction of the Commissioner of the General Land Office, and shall be furnished to any person applying for the same, at the cost of paper and printing with 25% added thereto, and all monies received for such copies of maps shall be covered into the Treasury of the United States.

Strike out in Sec. 33 the part, "And every Surveyor-General hereafter appointed," etc.

Add to Sec. 29, "And that the Deputy Surveyors shall have authority to administer the necessary oaths to their assistants."

Substitute for fifth part of Sec. 2,223 of Revised Statutes, with the amendment of making compensation of agents \$8 per day instead of \$5.

Substitute for Sec. 47, Sec. 2,230 of the Revised Statutes.

Strike out Sec. 49 and substitute Sec. 2,411 of the Revised Statutes with the amendment to make it apply to all surveying districts.

Strike out Sec. 50.

Insert in Sec. 53 the word "general," so as to make it read, "Under such general rules and regulations as may be prescribed," etc.

In Sec. 54 insert after the word "whenever," "Upon the recommendation of the proper Surveyor-General."

Strike out Sec. 55.

In Sec. 58 insert the word "mineral" "and pasture."

Add a section to read, the rates for survey shall be as follows: Lands not mountainous or covered with thick undergrowth, or heavily timbered, \$8 per mile of section lines, \$10 per mile of township lines, and \$12 per mile for standard, meridian and meander lines.

Lands, without heavy timber or thick undergrowth, or lands not mountainous with such timber or undergrowth, \$10 per mile for section lines, \$14 per mile for township lines, \$16 per mile for standard, meridian and meander lines.

Lands mountainous and heavily timbered, or covered with thick undergrowth, at such rate as the Surveyor-General may recommend, and the Commissioner of the General Land Office approve, not to exceed \$18 per mile for section lines, \$24 per mile for township lines, \$28 per mile for standard, meridian and meander lines.

Add a section to read as follows: Whenever special kinds of monuments are prescribed to be used in the public surveys, the cost thereof may, with the approval of the Commissioner of the General Land Office, be paid for out of the general surveying appropriation.

Questions Submitted by the Honorable Commissioner and Members of the Convention.

1. What, if any change is necessary in mineral surveys and monuments, and should not permanent monuments be provided for by appropriations for that purpose or from the appropriations for public surveys? Has the latter been done in any district? [Remark by the Commissioner: In California a deputy, paid from appropriation under Sec. 2,411 R. S., has been used to establish such monuments and the expense of the monuments paid out of contingent fund.] It is the sense of this convention that mineral monuments should be of a uniform size and according to a prescribed pattern to be adopted, and each monument should be paid for out of the appropriation for public survey; and that such monuments in various districts shall be connected by triangulation, and Congress be asked to make appropriations based on the estimates. It is the sense of this convention that the mining laws of the United States, as now existing, if faithfully and strictly carried out according to the circular of instructions issued by the General Land Office on June 10, 1872, and November 20, 1873, while susceptible of improvements, meet all ordinary requirements. That the faults of the present system are to a large extent faults of the administration, caused in many instances by the practice, grown up in the General Land Office of assuming jurisdiction over details, properly belonging to the Surveyor-General only, which results in such a division of responsibility that it is difficult to fix it upon one or the other in case of mistake. It is further the sense of the convention that Surveyors-General should require, as precedent to issuing instructions for the survey

of any mine, a strict compliance with the said instructions regarding locations, found on page 278, Copp's United States Mining Decisions, and in said circular instructions of November 20, 1873. It is further the sense of this convention that if said instructions of the General Land Office, found on page 278, Copp's Mining Decisions, and in the circular dated November 20, 1873, respecting Tunnel Rights, are strictly carried out, and that if compliance with such instructions is required prior to the order for survey being issued, it will prevent much litigation, and will result in doing away with much ground for complaint which has existed against present laws. It is the sense of this convention that legislation is required providing for the compulsory survey of all mining locations made prior to the act approved May 10, 1872, within one year, and canceling and harring all such locations unsurveyed after such time.

2. By what means can better work be secured under present laws regarding public surveys? It is the sense of this convention that such result can be accomplished by increasing the maximum rates for difficult work and by providing means for the rigid inspection of the work in the field.

3. Is there authority of law for establishing more permanent and expensive monuments and corners? It is the sense of this convention that the Commissioner of the General Land Office has authority under the law of prescribing the kind and character of the monuments to be used in the public surveys, and that if more expensive monuments, other than those heretofore in use are prescribed, he has the authority to order the same paid for out of the regular surveying appropriation.

4. What good results may be obtained by a thorough system of inspection, and if good results can be obtained, what amount of money for each district is necessary to pay for such inspection? It is the sense of this convention that 10% of the amount expended in each district for surveys is necessary to pay the expense of inspection, and that better and more accurate work will be secured thereby.

5. Are public surveys being made as fast as demanded by the progress of settlement, and could not a much larger area be surveyed annually by a slight increase of clerical force in the Surveyor-General offices? It is the sense of this convention that the public surveys are not extended as rapidly as demanded by the settlement of the country, and that it is to the best interests of the Government and the settlers that surveys should precede settlement instead of following it. It is further the sense of this convention that the public surveys should be completed in the several surveying districts as rapidly as practicable, and that it would be wise economy to provide the means necessary for the early completion of surveys in those districts wherein the public surveys are now nearly finished, so that the offices of Surveyors-General in said districts may cease as provided by law. It is the sense of this convention that appropriations for clerk hire and incidental expenses for the several Surveyors-General offices should be increased from 25% to 50% of the present appropriation, and that such increase would enable said officers to have a much larger area surveyed annually.

6. In what manner can the surveys be made within the limits of certain railroad grants where the law requires the cost of such surveys to be paid by the railroads, it being remembered that the Government retains each alternate section of the land, and that all the sections must of necessity be surveyed together? Is it desirable to hasten surveys within railroad grants to the end that the lands may be conveyed to the railroad companies, and hence become subject to taxation in the States and Territories where situated? If so, how is this to be done? It is the sense of this convention that every consideration demands the survey of such lands as early as possible, not only for the reason that the lands would thereby become subject to taxation, but, also, for the further reason that the grant practically operates to withdraw all the land within it from settlement as long as the land is unsurveyed, because the settler is unable to tell whether he is on land belonging to the railroad company or on public land. This uncertainty operates injuriously to the best interests of the country. The early survey of such lands should be compelled by legislation by requiring the companies to make deposits, the United States furnishing equal amounts for their proportion of said lands. It is the sense of this convention that legislation is necessary, providing, that whenever the railroad companies pay their proportion for the survey of such lands, an equal amount shall be placed to the credit of the surveying appropriation out of the treasury of the United States.

7. Is the price by law for surveying public lands enough to secure competent surveyors, who will perform the work according to law? It is the sense of this convention that with the present kind of monuments in use and present requirements, the rates are sufficient for certain classes of lands, but that the maximum rates should be much higher for difficult classes of work, as indicated in the proposed section of the Public Land bill heretofore referred to.

8. Should timber lands be surveyed into smaller sub-divisions than is now provided for by law, or by the custom of surveys, and be more permanently marked with the view to more readily detecting trespassers? If so, how should it be done and what should be the cost? It is the sense of this convention that this should be left to the sound discretion of the Commissioner of the General Land Office, who

should have authority, upon the recommendation of the Surveyor-General, to cause timber lands, where it may be advantageous or necessary, to be surveyed into 40-acre sub-divisions. No general rule would be applicable in this matter. It is as desirable, and more so, to have the boundaries in timber lands more permanently marked than other lands, as it would greatly facilitate the detection of trespasses thereon. It should be done as other public surveys, and the cost should be such reasonable allowance within the limits prescribed by law as may be determined by the Surveyor-General with the approval of the Commissioner of the General Land Office.

9. Is it desirable that public lands shall be surveyed under the special deposit system; are fraudulent representations made as to being settlers in the townships for which special deposits are being made; if so, what is the apparent motive for such fraudulent representations? It is the sense of this convention that if any fraudulent representations are made as to persons being settlers in the townships for which special deposits are being made, they are only isolated cases, and that the present instructions which require the affidavit of two persons to the fact of such applicant being a settler are simply sufficient to check such fraudulent representations, if any have been made; but that in any event the Government cannot suffer any injury thereby except in so far that lands might possibly be surveyed which it might not be necessary or desirable to survey at this time, but that such instances can only be of rare occurrence, and could not be carried on upon a large scale without detection. The only motive for such fraudulent representation that we can conceive of is, that some Deputy Surveyor who is anxious to obtain work may, in some instances, have induced persons to represent themselves as settlers when they were not so in fact.

10. If it is desirable to make surveys under the deposit system, would or would it not be for the interest of the Government to adopt that as the only method for making surveys? (Adopted as a good but not the only method.) Could this be done by making the certificates of deposit a legal tender for any and all lands not otherwise disposed of, thus in effect bringing into market about one section in a township, or about one thirty-sixth part of the land, the proceeds of which pays for the survey of the whole, would such a system be proper? It is the sense of this convention that if Congress desires to get rid of the expense of maintaining the offices of Surveyor-General at the earliest possible moment by completing the surveys at once in all the districts, it could easily be done by making certificates of deposit issued for the survey of public lands a legal tender for any and all lands not otherwise disposed of. This convention does not suggest such a system, however, for the reason that it would not be in accordance with the present policy of the Government in the disposal of the public lands, but respectfully refers the matter with this expression of opinion to the Department of the Interior and the consideration of Congress.

11. Should a new Surveying Manual be prepared, and if so, how can this best be done? It is the sense of the convention that the Commissioner of the General Land Office be empowered to appoint from this organization a committee to meet at a certain time and place, which committee may avail itself of necessary information from other Surveyors-General, and that under instructions of the committee shall frame a manual suited to the best interests of the service.

12. Should base standard and meridian lines be run over Indian and military reservations, and if so, is action on the part of Congress necessary? It is the sense of this convention that base standard and meridian and township lines should be run over Indian and military reservations, and that no legislation is necessary for this purpose, but that the Surveyors-General have the power and authority to run said lines over said reservations. (Also that such base standard and meridian lines shall cover all the land in States and Territories in squares of 24 miles as near as may be.)

13. Should Surveyors-General receive a fee payable from a special deposit fund for each mineral survey examined, whether approved or disapproved? It is the sense of this convention that considering the increased responsibility to Surveyors-General, as well as increase of onerous work entailed upon them by mining surveys, that they should be allowed to collect a fee of \$10, from each applicant for a mining survey.

14. Is it the intention of the law that Surveyor-General may hold from his apportionment a sum sufficient to make inspections of surveys made in the same fiscal year? If not, how can the expense of inspection be provided for? It is the sense of this convention that each Surveyor-General has the power, with the approval of the Commissioner of the General Land Office, to set apart a proper portion of his surveying appropriation to pay the expense of the necessary inspections in the field.

15. In some of the districts it has been the practice to specify particularly the townships and lines to be surveyed in the contracts. This practice is objectionable for many reasons. Why should not deputies have a contract to a certain amount, and give bond to cover that, and as the surveys are needed, the Surveyor-General can instruct the deputy what to survey? It is the sense of this convention that contracts with deputies should be for the survey of such lands as the deputy may be instructed to survey, with the rate specified, and a bond thereto

covering double the amount of the liability, and the deputy should then be instructed what townships or lines to survey under said contract. It is the sense of this convention that the rectangular system of surveys is the best that can be devised for parcelling of the public lands. That in order to combine the greatest accuracy with economy, it would be advisable to establish base, standard and meridian lines by deputy surveyors, under the direction of the Surveyor-General, at a per diem compensation, and all other and sub-division lines as now under the contract system. It is the sense of this convention that by these means all possible errors would be confined within comparatively small spaces, and that the surveys thus executed under these different systems would operate as checks upon each other, and this plan would combine both—all necessary accuracy and economy. It is the sense of this convention that in the estimates for survey under the special deposit system, 10% additional should be added to cover cost of examination in the field.

Respectfully submitted,

JACOB H. STEWART,
FRED. SALOMON,
THEO. WAGNER.

The following resolution was adopted by the convention:

WHEREAS, It is the belief of your committee, founded upon the nearly unanimous and common experience of the people and press in mining communities, in opposition thereto, had since December last, that Congress will not enact the mining legislation proposed by the Public Land Commissioner, and

WHEREAS, To amend said proposed mining legislation so as to meet the views of your committee, would require the preparation of substantially a new bill, covering many details required in the procurement of patent to mineral lands, and

WHEREAS, Your committee cannot possibly prepare such a bill in the time at its disposal; therefore be it

Resolved, That it is the sense of your committee that the convention of Surveyors-General will best accomplish its duty in respect to the mining interests of the country at large by confining its efforts to pointing out needed changes in the mining act of May 10, 1872, and the regulations thereunder.

(Signed) ROSWELL H. MASON,
ALBERT JOHNSON,
A. J. HATCH,
JOHN WASSON.

This suggestion, submitted by R. H. Mason, of Montana, was unanimously accepted as the sense of the convention. It will be found of especial interest to the cattle men.

Submitted by Mason, of Montana. Although the matter of the sale and disposal of the public land has not been presented to this convention, yet as all matters pertaining to the public land laws are of interest to the members thereof, they desire to respectfully submit the following suggestion for consideration by Congress:

That pasturage and irrigable lands should be leased in large bodies for a term of years, and at a proper rental per annum, to parties desiring to use the same for grazing purposes; that said leases should contain a clause permitting all qualified parties to make homestead and mineral land entries and State land selections within the limits of the land embraced in such leases; and that at the expiration of such leases the parties holding the same shall have the right to purchase all that portion of the land upon which no entry or State selection has been made at a price to be fixed by law.

Commissioner Williamson congratulated the convention on the very satisfactory manner in which the business had been transacted. The members, one and all, expressed themselves as highly pleased with the associations and acquaintance among themselves which they had formed while engaged in the work they came here to perform. The result of this meeting cannot but be productive of good results in the near future. The country will then be ready to accord to these gentlemen their mead of praise and commendation.—Salt Lake Tribune.

MINING EXPERTS.—The Inyo, Cal., Independent gives the above class of humbugs the following pointed notice: There are on the Pacific coast, quite a number of so-called "mining experts" and "rock sharps," but who are knaves and humbugs—without principle or honesty, knowledge or experience in mining. These fellows are generally good, plausible talkers, and have any amount of cheek and assurance. They work themselves into the confidence of the honest and unexpecting capitalist who contemplates investing in mines, and they are sent out to examine and report. In many cases the report is favorable; money is invested, and after a practical working of the mine, it proves to be worthless, and the investor comes to grief through the ignorance of the expert. During the past two years some of these Pacific coast expert-humbugs, finding themselves too well known in California and Nevada, and, sending new dupees in New York and other Eastern cities, have "fitted out" for the Atlantic coast. Many a mining company has been swamped, and the prospects of many a district ruined by the ignorance and knavery of these spectacled frauds. Whenever they are mentioned, one familiar with them is forcibly reminded of the terse description given by the Nevada miner, who said a mining expert was a man who wore eye-glasses, talked Dutch, and didn't know a deuced thing about a mine.

MECHANICAL PROGRESS.

To Obtain Well Defined Castings.

To obtain sharper and better defined castings, Messrs. Thorp and Tesker, of Whitefield, Lancashire, England, enclose the mold or molding box within a chamber, in which a suitable degree of vacuum can be obtained, and they run in the metal in vacuo and afterwards admit air or gas into the chamber. In the apparatus they have devised for the purpose the molding box is enclosed in a metal chamber, which is provided with a lid or door, the meeting surfaces being planed or faced, so that a suitably air-tight joint is obtained when the door is closed, with or without the interposition of a joint ring or of backing, as preferred, or found to be most efficient. A shaft to carry a crucible or pot to hold the melted metal, passes into the interior of the chamber, and is provided with handles or with arrangements for tilting the said crucible or pot. A slight hole closed with glass, or two or more of such holes, is or are formed in said door or in any suitable situation in the walls of the chamber, so that the progress of the running in may be inspected. The said chamber is connected with a vacuum chamber, in which a degree of vacuum is obtained by means of an air-pump or of air-pumps, or by other suitable means. When the arrangements for the running are completed, the door of the molding chamber is closed, and the communication with the vacuum chamber is opened. The metal is then run into the mold, and air is admitted into the molding chamber. They prefer to use a two-way cock, which, when turned to shut off the connection with the vacuum chamber, opens a passage for the admission of air to the molding chamber. The last named chamber may be large enough to contain more than one molding box. They may connect said chamber directly with the air-pump, so as to dispense with the vacuum chamber, or employ the air-pump to increase the tension of the vacuum partly formed by the said vacuum chamber. In place of the crucible or pot being enclosed within the chamber they may pour the metal into a passage leading from the outside to the inside of the chamber, or into a container communicating with the interior of the chamber or with the interior of the mold, the atmospheric pressure forcing the metal into the chamber or mold, when a plug closing the passage is withdrawn or eased, or when the passage is otherwise opened.

Power of Windmills.

Windmills are apparently gaining in popular favor of late, but, at the same time, there seems to be a demand for reliable information as to their efficiency and power on the part of the purchasers. We have been unable to discover a record of any experimental determination of these data obtained from American mills. In the last century Coulomb made some experiments in France upon a Dutch windmill of four sails, each 35 ft. long and 6½ ft. broad, with good angles of "weather," and ascertained that when driven by a wind of 22 ft. per second velocity, an amount of work equal to a little above seven horse-power was performed.

The quantity of water raised by one of our best American windmills, accepting the manufacturer's statement as correct (which we have reason to do), shows that a 25 ft. velocity wind develops, when propelling a mill of 25 ft. diameter of wheel, 1.34 actual horse-power. This appears as a small result when the first cost of the mill is considered, but when the slight expense of running the mill is taken into account, the economy of windmills is more apparent. Besides, in the American mill, little attention has been paid to securing the best angles for the "sails" or blades, which would greatly increase their efficiency if adopted. In order to augment the efficiency and value of windmills, a series of careful experiments should be instituted, the results of which would furnish data for comparison and improvement.—*American Engineer.*

How to Fire Steam Boilers.

Mr. J. F. Tallant, in the *Milling World*, tells the amateur engineer how to fire steam boilers. He says: In placing a steam boiler in a furnace it is usual to employ grate bars, even for coal, about four ft. long, the same length that was necessary where wood fuel was used. The rear end of the bars should be at least the thickness of a brick, or upwards of two inches, lower than the front. The boiler should also be placed two inches lower at the rear than at the front, and the bridge wall should come within three inches of the boiler, if the draft is good.

The best grate bars now used are of a zigzag shape on the top, so closely placed that coal lumps upwards of one-eighth of an inch through cannot drop between. Three stoking pokers should be used—one a plain straight poker, another with claws, and another like a hoe. In firing, the coal should be so distributed as to be totally consumed without smoke, if possible. The more smoke, the worse the firing.

After steam is raised and work is fully begun, in replenishing the fire, the glowing coals should be pushed back with the iron hoe toward the bridge wall, and if any clinker is seen, remove with the claws. The fresh coal should be well scattered over the front, so that the smoke will

pass over the red hot coals and be consumed by them. Avoid making piles of coal on the bars. It is often beneficial to have a very small steam pipe open into the furnace, to give a spray of steam to the flaming mass. Water being composed of two most combustible ingredients, oxygen and hydrogen gases, when the steam is decomposed the heat becomes most intense. This pipe should be regulated by a cock, and it requires considerable skill, as an oversupply of steam will quench the fire instead of increasing it.

To permit a boiler to run too full of water is as wasteful of fuel as it would be dangerous to have too little. Of the two extremes, the latter is most common, generally through carelessness. To fire efficiently yet economically is a very skillful, intelligent operation, and the man who can do it and actually does it for his employers cannot be too highly esteemed by them, or be too well paid. Brains and vigilance as well as main strength and muscle must be used continually.

Sheet-Iron Roofing and its Advantages.

When made of first-class materials and properly put on, roofs of sheet iron are admirably adapted to withstand fire, wind, weather and accidental contingencies that affect the durability and quality of such coverings. Roof coverings of sheet iron are manifestly superior to many other forms. As compared with shingles they have the advantage of being far more permanent, free from the liability to the warping and shrinking which soon develop leaks in shingle roofs, and they are free from the fire danger to which the latter are notoriously subject. As compared with slate, which is popular in many quarters, a sheet-iron roof can be made more thoroughly storm proof, as the material admits of being fitted more closely and snugly to irregularities of the roof than the former; it is not liable, as slates are, to be cracked by frost, or injured by the falling upon it of heavy objects, and is free from the liability of cracking and splitting, which, in the event of a fire, often impairs the fire-protective qualities of a slate roof, and is especially manifested when cold water is thrown upon them while highly heated. As compared with tin roofs, those of sheet iron have all the advantages of the former, and in addition are made of heavier sheet, and the method of making the seams generally adopted in iron roofing dispenses with the necessity of soldering—one of the troublesome features of the tin roof. The seams in a tin roof are so small and narrow, that as soon as contraction of the metal breaks the solder the seams will leak. When iron roofing has not proved satisfactory, it can almost always be traced to a neglect of some important requirement. Much of the iron roofing in the market is made from a common iron, with very porous texture, and the surface frequently painted with inferior oil or paint having in it a large proportion of benzine driers.—*Manufacturer and Builder.*

A Petroleum Motor.

A correspondent of the *Manufacturer and Builder* furnishes that journal with a description of a novel motor that has been placed in a small United States steam launch, and loaned to the manager of the Exeter (N. H.) Machine Works for experimental purposes. This motor is known as "the Brayton petroleum engine," the motive power of which, according to the correspondent above alluded to, consists of a gas cylinder and air pump, placed longitudinally side by side, and connected to the same crank shaft. The power is originated by the combustion of petroleum oil in the gas cylinder, which is supplied with compressed air from a receiver, in which it is kept at the desired pressure through the agency of the air pump, the speed of the engine being increased or diminished by graduating the quantity of air introduced into the gas cylinder from the air tank. The engine makes about 300 revolutions a minute, and the main (or gas) cylinder is kept cool by water which circulates up through one piston rod and piston head, passing out through the other piston rod. On the shaft is a large spur wheel which gears on to the wheel that drives the propeller. The connection with the propeller shaft is one of the most ingenious features of the invention; the engine always moves in the same direction, whether the boat is going ahead or backing, the motion of the screw being governed by two cog-wheels, one of which it drives forward and the other backward; these are controlled by friction clutches, which are operated by air pressure from the tank. The propeller is under the direct control of the pilot, who governs its direction by means of a small lever located close to the wheel, so that the going ahead, easing and reversing are entirely independent of the engine. The motive power is obtained from petroleum, contained in a small tank forward, which is fed to the engine automatically as required.

CARE OF RUBBER BELTS.—When a rubber belt slips it should be lightly moistened with boiled linseed oil; animal oil will ruin the belt. If one application does not produce the desired result, repeat it until it does. The belts will be greatly improved and their durability increased by coating the surface lightly with a composition made of equal parts of black lead and litharge, mixed with boiled linseed oil and Japan enough to cause it to dry quickly; the effect of this will be to produce a finely polished surface,

SCIENTIFIC PROGRESS.

Some Facts About Jupiter.

The report of the Chicago Astronomical Society shows, during the past year, some good work done by Profs. Hough and Colbert on observations of the planet Jupiter. With magnifying power of 633 on the 18½-inch refractor, the disk of the planet was measured on eight nights by Prof. Hough and six by Prof. Colbert, the resulting values for ellipticity being respectively 1-16.23 and 1-16.73, sensibly smaller than Struve's value, though not differing much from other more recent determinations. The measure further showed "the figure of Jupiter's disk to be a true geometrical spheroid." Jupiter's belts were also carefully noted, and it was found that the middle of the great equatorial belt was subject to gradual change in its appearance between September 1st and November 1st. At first it was made up essentially of three separate belts, approximately of equal width; gradually it formed in two nearly equal portions, with a rift extending through a large part of the planet's circumference. The color of the equatorial belt was reddish-brown—brick-color.

The red spot was studied from September 3d to February 10th. Its color was similar to that of the equatorial belt, but brighter, and appeared sensibly the same when only partially on the disk as when on the center. The mean value of its length at the center of the disk was 12".73, and its breadth 3".56 for Jupiter's mean distance; the length appeared to vary to the extent of 2 seconds, and the breadth about the same amount; but owing to the irregular outline of the object, it was difficult to decide whether actual change took place, or whether the discordances in the measures were due to indifferent vision. By observations extending from September 25th to February 10th, the time of sidereal rotation was found by Prof. Colbert to be 9h. 55m. 34.2s.

A New Comet.

A new comet was discovered at the Ann Arbor Observatory, Michigan, on the evening of Sept. 30th. The next day a telegram was received from Europe announcing its discovery at Strassburg, a day earlier than at Ann Arbor. It is described as a superb telescopic object, just visible to the naked eye, but not growing any brighter as at first hoped. It has a large bright head with a sparkling nucleus, and a faint tail about two degrees in length. The head is nearly as bright, in the telescope, as the great cluster in Hercules. The tail points upward or away from the sun. It is moving about three degrees daily in an easterly direction, or nearly in a line drawn from Alphecca to Altair in the Eagle. It is a beautiful object, and its scientific value will be very great. When it first seen it was in right ascension, 14 hours, 8 minutes and north declination, 29 degrees, 45 minutes.

ELECTRIC FISHING.—An electric fish-hook has excited much attention and curiosity at the Berlin exposition. It is attached to a little skiff, which can be directed noiselessly toward any point of the water by means of a helix and wheel work. When reaching the desired location it anchors itself against wind and stream while the line and hook glide into the water. The skiff contains an electric battery and an induction coil, so arranged that the slightest hit completes the electric circuit. Immediately, with the rapidity of a flash, under the action of an electro-magnet, the line, hook and fish are raised into the air; a little bell rings to inform the fisherman of the capture, so that he can draw the skiff ashore and detach the fish.—*Les Mondes.*

INFLUENCE OF ELECTRICITY ON VEGETATION.—In hamboos the flow of sap takes place at the beginning of the rainy season, but vigorous shoots rarely grow before the thunder storms, which generally precede the harvest. The rapidity of their growth increases with the violence of the storm, amounting sometimes to as much as 70 ft. in 30 days, the vegetation being most active during the night. Capt. Sleeman suggests that the cause of this sudden growth may be the increase in the quantity of nitrogenous compounds, which are greedily absorbed by the humus that surrounds the roots of the hamboos. The facts offer a curious confirmation of the experiments of Dr. Siemens upon the influence of electricity on vegetation.—*Les Mondes.*

DEMONSTRATED.—Pasteur's theory that the formation of vinegar is a physiological phenomenon caused by the vegetation of a particular bacterium, *Mycoderma aceti*, has been apparently demonstrated to be correct by Herr Wurm, in experiments at the Breslau Institute of Plant Physiology. He has succeeded, according to report, in effecting the economical production of vinegar on the commercial scale, in accordance with Pasteur's views.

PHOSPHORESCENT LIGHTING.—Dr. Phipson takes sulphide of barium, or some other substance which is rendered phosphorescent by the solar rays, and incloses it in a Geissler tube, through which he passes a constant electric current of a feeble but regular intensity. He claims to obtain in this manner a uniform and agreeable light, at a cost lower than that of gas.—*Les Mondes.*

New and Interesting Stellar Observations.

Prof. E. C. Pickering, Director of the Harvard Astronomical Observatory, has recently made a discovery which is regarded as one of the most important in the history of the spectroscopy in regard to stellar physics. In the ordinary telescope a star appears as a point of light, brighter, but not larger than when looked at with the naked eye. Prof. Pickering finds that on placing a prism between the object glass and the eyepiece of his telescope, the light of a star is drawn out into a continuous band. When, however, the telescope with the prism is directed to planetary nebula, the light is collected into a star-like point without any hand, enabling the astronomer to distinguish immediately between a star and a planetary nebula. The difference in their appearance is so marked that the idea suggested itself that this device might serve to detect any minute planetary nebulae which could not otherwise be distinguished from stars. A systematic search was immediately undertaken, and on Thursday evening, Aug. 26th, an object was observed which presented the appearance of two star-like points within the band in the modified telescope. It is different from anything heretofore observed in the telescope, and is regarded as an important object for investigation.

In addition to this first discovery four other objects have since been discovered which are distinctly recognized as new planetary nebulae, one of which presents a very curious spectrum, two hands being seen near the ends of a faint continuous spectrum. It is difficult to know in what class to place this body, as it resembles a nebula in some and a star in other respects.

TO DETECT GAS IN MINES.—An ingenious instrument, termed a "spark tube," for indicating the presence of inflammable gases in mines, was lately exhibited and explained at the meeting of the Manchester Geological Society, by Dr. Angus Smith. The design of the instrument is taken from the old compression syringe used for igniting tinder, and the instrument consists of a small brass tube with glass let in at the bottom, which is closed up, and a piston and rod fitting closely in the tube. The air to be tested is taken into the tube either from the top or by means of a stop cock at the bottom, and the piston then rapidly pressed down with the hand, the compression of the air thus effected with the aid of spongy platinum causing the gaseous to explode inside the tube, the explosion being visible through the glass let in at the bottom. Dr. Smith stated that the presence of gas down to 2½% could be detected by the instrument, and as the explosion within the tube was perfectly harmless, he thought the instrument might afford a useful means for exploring gaseous mines.

SCIENTIFIC RESEARCH.—The industry, and sometimes eccentricity which guides scientists in the selection of their work is well known. An instance in point has just been brought to notice. Dr. George Thin is reported to have solved the moist and most unpleasant mystery of the cause of the peculiarly offensive fetid odor by which the secretion from the skin of certain people's feet is characterized. He finds it due to the development in the liquid, after secretion, of a micrococcus, which he names *Bacterium fetidum*. It is gratifying to know that the author has convinced himself that this organism and unpleasant effects which it produces can be destroyed by the proper use of antiseptics.

THE TELEGRAPH AS AN AID TO FISHERMEN.—From time immemorial the fishermen of the Mediterranean shores, of Cornwall and of the Scandinavian coasts, have been directed in their work by lookouts stationed upon cliffs to discover the approach of the finny schools. Of late the enterprising fishermen of Norway have called to their aid the electric telegraph, laying down more than 1200 miles of wire, to bring the fishers into instant communication with the watchers, and to notify the fish merchants where to go for supplies. The Norwegian coast gives employment to 40,000 fishermen during a large part of the year.

TECHNICAL BREVITIES.—A correspondent of the *Journal of Microscopy*, reports that he has had excellent success in mounting organic preparations in a preservative liquid, composed of two parts eucalyptic acid and one part borax, dissolved in half an ounce of glycerine, and then diluted with three parts of water. For very delicate preparations, the liquid should be diluted with more water.

INTEREST IN SCIENTIFIC RESEARCH.—Perhaps no more significant illustration could be found of the interest that is felt in scientific research, and of the activity with which scientific investigation is pushed, than in the single fact that at the late Boston meeting of the American Association for the Advancement of Science, nearly 600 new members were admitted.

ANNUAL RINGS.—It appears that the rings of trees do not always denote a year, for the blue gum tree of Australia sheds its bark twice a year. A tree recently hewn, that was known to be only 18 years old, showed 36 distinct rings of growth.

RECENT EXPERIMENTS by Piazzoli appear to establish the fact that the tenacity of iron increases on magnetization.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Oct. 7.	Week Ending Oct. 14.	Week Ending Oct. 21.	Week Ending Oct. 28.
Alpha.....	2.4	4.80	4.40	4.4
Alta.....	3.20	2.80	2.70	2.60
Andes.....	1.65	1.35	1.30	1.10
Alps.....	400	300	300	250
Argonia.....	400	300	300	250
Atlantic.....	400	300	300	250
Aurora Tunnel.....	400	300	300	250
Baltimore Con.....	400	300	300	250
Belcher.....	400	300	300	250
Belmont.....	400	300	300	250
Best & Belcher.....	400	300	300	250
Bullion.....	1.90	1.60	1.4	1.35
Bechtel.....	1.90	1.60	1.4	1.35
Belle Isle.....	400	300	300	250
Bodie.....	4.55	3.2	3.1	3.0
Benton.....	1.20	1.05	1.10	1.05
Boyle.....	12	13	13	13
Black Hawk.....	200	150	100	100
Belvidere.....	400	300	300	250
Booker.....	150	100	100	100
Caledonia.....	2.15	2.05	2.0	2.0
California.....	2.15	2.05	2.0	2.0
Challenge.....	1	1	1	1
Chollar.....	3.1	3.05	2.65	2.6
Confidence.....	300	250	250	250
Con Imperial.....	3.05	2.70	2.55	2.5
Con Virginia.....	1.90	1.2	1.25	1.25
Crown Point.....	1.90	1.2	1.25	1.25
Oon Washoe.....	400	300	300	250
Champion.....	400	300	300	250
Concordia.....	400	300	300	250
Dayton.....	400	300	300	250
De Fries.....	400	300	300	250
Danby.....	400	300	300	250
Day.....	400	300	300	250
Eureka Con M Co.....	400	300	300	250
Excelsior.....	1.95	1.35	1.60	1.35
Endowment.....	400	300	300	250
Gen Thomas.....	2.05	1.8	1.6	1.6
Grand Prize.....	400	300	300	250
Gila.....	400	300	300	250
Golden Chariot.....	400	300	300	250
Golden Terra.....	400	300	300	250
Goodshaw.....	400	300	300	250
Gould & Curry.....	4.70	3.4	3.70	3.4
Hale & Norcross.....	5	4.05	4.60	4.30
Hillside.....	400	300	300	250
Highbridge.....	400	300	300	250
Homeside.....	400	300	300	250
Hussey.....	400	300	300	250
Independence.....	750	450	450	400
Julia.....	600	500	550	550
Justice.....	750	600	500	500
Johnson.....	400	300	300	250
Joe Seale.....	400	300	300	250
K K Con.....	400	300	300	250
Kentuck.....	2	1.90	2	1.8
Kossuth.....	400	300	300	250
Keystone.....	400	300	300	250
Lady Bryan.....	400	300	300	250
Lady Wash.....	400	300	300	250
Leopard.....	400	300	300	250
Leviathan.....	400	300	300	250
Leadville.....	400	300	300	250
Lee.....	400	300	300	250
May Belle.....	400	300	300	250
Modoc.....	1.1	1.2	1.1	1.1
Manhattan.....	400	300	300	250
Martin White.....	400	300	300	250
McClinton.....	400	300	300	250
Meadow Valley.....	400	300	300	250
Mexican.....	100	80	90	80
Miles.....	400	300	300	250
Morning Star.....	400	300	300	250
North Con Virginia.....	250	150	150	100
Northern Belle.....	110	11	11	10
New Concord.....	400	300	300	250
Nevado.....	400	300	300	250
Occidental.....	1.10	1.10	1.1	1.05
Ophir.....	90	80	80	80
Overman.....	1	50	1.00	1.00
Phil Sheridan.....	400	300	300	250
Potomac.....	2.70	2.1	2.65	2.70
Prospect.....	400	300	300	250
Raymond & Ely.....	400	300	300	250
Richter.....	400	300	300	250
Rock Island.....	400	300	300	250
Rye Patch.....	400	300	300	250
Rough & Ready.....	2.60	2.55	1.90	1.65
Seg Belcher.....	110	110	100	100
Sierra Nevada.....	400	300	300	250
Silver Hill.....	100	100	90	80
Silver King.....	400	300	300	250
Silver Prize.....	400	300	300	250
Sucon.....	400	300	300	250
Summit.....	1.90	1.45	1.80	1.40
Scorpion.....	400	300	300	250
Solid Silver.....	400	300	300	250
South Boulder.....	400	300	300	250
Star.....	400	300	300	250
St. Louis.....	400	300	300	250
Syndicate.....	400	300	300	250
Tioga Con.....	400	300	300	250
Tipton.....	400	300	300	250
Trojan.....	400	300	300	250
Union Con.....	200	140	150	150
Utah.....	90	80	80	80
Vernmont Con.....	400	300	300	250
Ward.....	400	300	300	250
Wells-Pargo.....	400	300	300	250
Woodville.....	400	300	300	250
White Cloud.....	400	300	300	250
Yellow Jacket.....	4.35	4.4	4.70	4.20

Sales at S. F. Stock Exchange.

Thursday A. M., Oct. 28.	Afternoon Session.
850 Alta.....	2.95(22) 90
215 Andes.....	1.05(35) 30
285 Bullion.....	1.35(25) 25
840 Belcher.....	2.45(20) 40
110 B & Belcher.....	2.05(20) 30
470 Benton.....	85(30) 30
280 Con Virginia.....	2.80 40
240 Chollar.....	1.05(20) 20
445 California.....	1.05(20) 20
380 Crown Point.....	1.20 30
100 Con Imperial.....	200 20
90 Gould & Curry.....	3.65 40
110 Hale & Norcross.....	4.05 40
50 Justice.....	120 20
260 Julia.....	450 40
170 Mt Diablo.....	4.05 40
520 Mexican.....	7.75(20) 20
190 Northern Belle.....	1.05(20) 20
450 Nevada.....	750 40
500 Ophir.....	60 30
170 Oro.....	1.15(20) 20
100 Overman.....	1.05(20) 20
515 Sierra Nevada.....	8.75(20) 20
50 Silver Hill.....	400 40
380 Scorpion.....	1.40(20) 20
20 Savage.....	1.05 40
15 Union.....	1.05 40
10 Utah.....	1.05 40
416 Yellow Jacket.....	4.30 40

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alhion Con M Co	Nevada	4	25	Sep 29	Nov 3	Nov 22	T R Chisholm
Amador Canal & M Co	California	3	1	Aug 13	Sep 21	Nov 2	R N Van Brunt
Belvidere M Co	Cal	8	40	Sep 15	Oct 19	Nov 8	C V Hubbard
Champion M & M Co	Cal	8	20	Oct 4	Nov 9	Nov 30	John Crockett
Caledonia M Co	Dakota	9	80	Oct 2	Nov 11	Dec 6	D F Vordenal
Caledonia S M Co	Nevada	32	25	Sep 14	Oct 20	Nov 10	R Wegner
Crown Point G & S M Co	Cal	43	50	Oct 7	Oct 18	Nov 10	J M Newlands
Bodie Creek Hydraulic M Co	California	6	15	Sep 12	Oct 27	Nov 16	R T Taylor
Excelsior M Co	Nevada	16	05	Oct 7	Nov 10	Nov 30	C E Elliott
Goodshaw M Co	Cal	7	25	Oct 1	Nov 1	Nov 8	A F Main
Hale & Norcross M Co	Nevada	66	75	Oct 4	Nov 8	Nov 30	J F Lightner
Justice M Co	Nevada	33	50	Sep 13	Oct 18	Nov 8	G F Kelly
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	Dec 10	C Van Dyke Hubbard
Martin White M Co	Nevada	7	60	Sep 4	Oct 24	Nov 18	J F Scoville
Maryland Con G & S M Co	Cal	2	15	Aug 10	Sep 15	Oct 30	E P Farnsworth
Mexican M Co	Nevada	13	1	Sep 23	Nov 17	Nov 17	O L McCoy
Monarch Christ M Co	Cal	4	10	Sep 21	Nov 1	Nov 29	E Burrie
Monro G M Co	Cal	9	50	Oct 13	Nov 19	Dec 9	W H Lent
New York M Co	Cal	24	15	Oct 11	Nov 13	Dec 3	D L Thomas
Overman S M Co	Nevada	47	50	Sep 7	Oct 13	Nov 3	G D Edwards
Real del Monte M Co	Nevada	12	25	Sep 7	Oct 8	Nov 1	C V Hubbard
Savage M Co	Nevada	44	1	Oct 4	Nov 5	Nov 26	E P Holmes
Silver Hill M Co	Cal	12	30	Sep 17	Oct 21	Nov 11	W E Dean
San Francisco Copper M Co	Cal	6	50	Sep 15	Oct 15	Nov 15	R H Pond
Tellurium M Co	Cal	23	10	Oct 17	Nov 17	Dec 14	J M Litchfield
Valerium G & S M Co	Cal	23	10	Sep 7	Nov 17	Dec 14	J M Litchfield
University M Co	Cal	7	10	Sep 6	Oct 12	Nov 2	W L Oliver
Tioga Con M Co	Cal	11	15	Sep 17	Oct 22	Nov 11	W H Lent
Yellow Jacket M Co	Nev	39	1	Oct 5	Nov 10	Dec 8	Mercer Otey

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Arnold G & S M Co	Cal	2	02 Oct 21	Nov 30	Dec 20
Belmont M Co	Cal	26	15 Oct 9	Nov 15	Dec 13
California G M Co	Cal	50	Oct 5	Nov 9	Nov 30
Cahorena M Co	Mexico	2	10 Oct 13	Nov 17	Dec 15
Cedar Hill Con M Co	Nevada	3	10 Oct 9	Nov 12	Dec 2
Commonwealth Con M Co	Nevada	7	15 Sept 22	Oct 25	Nov 22
Day S M Co	Cal	10	26 Sept 22	Oct 18	Nov 10
Dudley S M Co	Cal	13	10 Oct 20	Nov 4	Dec 15
Excelsior M Co	Cal	13	10 Oct 20	Nov 4	Dec 15
Gravel M Co	Cal	13	10 Oct 20	Nov 4	Dec 15
Iowa M Co	Nevada	11	03 Oct 13	Nov 15	Dec 6
Leeds M Co	Utah	2	10 Aug 25	Oct 4	Nov 1
Mt Potomac Cons M Co	Nevada	5	25 Oct 12	Nov 15	Dec 6
Monro G M Co	Nevada	5	25 Oct 12	Nov 15	Dec 6
Mountain M Co	Nevada	3	05 Sept 10	Oct 18	Nov 9
Occidental Con G M Co	Cal	5	06 Oct 11	Nov 30	Dec 20
Silveropolis G & S M Co	California	1	02 Aug 12	Oct 1	Nov 1
San Jose M Co	Cal	17	20 Oct 12	Nov 2	Dec 7
Wide Awake Prospecting M Co	Cal	11	10 Oct 18	Nov 25	Dec 18

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Western M Co	Cal	C S Curtis	309 Montgomery st	Annual	Nov 1
Gipey Queen G M Co	Cal	Ellie Edwards	330 Pine st	Annual	Nov 1
Occidental Con G M Co	Cal	W T Smith	402 Montgomery st	Annual	Nov 1
Noonday M Co	Cal	Wm J Taylor	310 Pine st	Annual	Nov 3
Real Del Monte M Co	Cal	O Van Dyke Hubbard	310 Pine st	Annual	Nov 4

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Consolidated Virginia M O	Nevada	A W Havens	309 Montgomery st	50	Aug 15
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	Sep 15
Golden Terra M Co	Nevada	J K Goodrich	309 Montgomery st	25	Sep 21
Grand Prize M Co	Nevada	E M Hall	327 Pine st	25	Sep 8
Tioga Con M Co	California	W W Parish	330 Pine st	10	Sep 1
Northern Belle M & M Co	Nevada	Wm Willis	309 Montgomery st	10	Sep 15
North Belle Isle M Co	Nevada	E M Hall	327 Pine st	15	Aug 23
Silver King M Co	Arizona	J Nash	315 California st	25	Oct 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	Sep 1
Western M Co	California	C S Curtis	309 Montgomery st	75	Sep 7

The Mining Share Market.

During the week a dull monotony has prevailed in the share market, and the only perceptible change was a tendency to the bottom. If the market closed in a languid state one day, it was a consolation to know that it would open weak the next. This morning (Thursday) the prices were lower than they have been for many a month, Union selling at \$11.50 and Savage at \$1.05. Is there no turn in the "dark lane" that leads to the Stock Exchange?

Referring to the condition of the market, the *Stock Report* of this date remarks that the hope of operators now is in the manner in which the market is being broken or being allowed to break. The general situation is very much the same as that immediately preceding the Sierra Nevada boom in 1878, and there is a particular similarity, of which our readers have probably taken no note or had no means of seeing. It will be remembered that the Sierra Nevada boom was ushered in by a Julia boom of no mean dimensions. There would seem to be something going on in that quarter of considerable importance. The operations in the market and the indications in the lower levels seem to foreshadow a movement in Bullion and Julia. Of what magnitude, of course, cannot be said, but everybody will be glad of some point on the Comstock in which to take an immediate and lively interest.

Bullion Shipments.*

Since our last issue, we have noticed the following bullion shipments:

Northern Belle, Oct. 18, \$7,570; Standard Con., Oct. 18, \$23,016; Christy, Oct. 23, \$8,470; Bodie, Oct. 24, \$11,980; Independence, Oct. 25, \$7,700; Idaho Gold Hill, Oct. 19, \$7,700; Northern Belle, Oct. 20, \$5,535; Star, Oct. 22, \$1,767; Mount Diablo, Oct. 23, \$7,827. At Salt Lake City, Oct. 18 to 23 inclusive—Ontario, \$36,092.17; Horn Silver, \$30,000; Tintic, \$4,756.04; Stormount, \$7,355.33; Christy, \$6,362.63; Barbee & Walker, \$2,353.24; Hillside, \$2,017.18; miscellaneous, \$76,476.71; total, \$167,413.30. Nevada county, for September—Idaho, \$45,000; Milton, \$30,300; North Bloomfield, \$15,600.

*Desiring to make our list of Bullion Shipments as complete as possible, we will be thankful to receive from mining Superintendents and Secretaries notice of all bullion shipments from their respective mines.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department No. 10, San Francisco:

IDA M. & M. Co.—Location: Arizona. Capital, \$10,000.00. Directors—J. C. Ayres, J. L. Murphy, A. Craig, G. Britton and N. J. Welch.

CALIFORNIA CENTRAL RAILWAY-YOSEMITE DIVISION.—Object: To build the Yosemite division of the California Central railway from a point on the Visalia division of the Central Pacific railroad in the vicinity of Madera, Fresno county, Cal., to a point near Fresno Plains. Capital, \$2,500,000. Directors—John C. Short, A. H. Washburn, Lyman Bridges, Samuel Miller, E. W. Chapman, F. Bridge and P. W. Johnson.

A NEEDED OFFICER.—According to the *Railroad Gazette*, a "Superintendent of Tree Culture" (Mr. Leonard Hodges) has been appointed for the St. Paul, Minneapolis and Manitoba railroad, and it is reported that he has already contracted for 300,000 trees. Most of the roads west of the Missouri, and probably most of those west of the Mississippi, might find profitable employment for such an officer, as their supplies of ties and timber are likely to become scarcer and dearer every year.

STEAM ON WALKER LAKE.—Walter Hamilton informs the *Gold Hill News* that he and J. F. Holland have a small steamer of 15 tons burden running on Walker lake, and that they are carrying freight from the head to the foot of the lake, a distance of 23 miles, for \$10 per ton. The road around the lake is 40 miles long, for freighting over which, teamsters charge at the rate of \$60 per ton. The little steamer makes eight hour trips. Thus far the transportation has been chiefly confined to railroad materials, but the public is beginning to use the boat for both freight and travel.

PARTIES IN SISKIYOU COUNTY, on Grizzly gulch, have found a rich quartz ledge just above placer mines which used to pay \$100 per day to the hand.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

AMADOR. NEWTON COPPER MINE.—*Jackson Ledger*, Oct. 23: This mine—the only copper mine in actual operation in the county—is running steadily, although not on an extensive scale. Only one shift of six men is working underground. This force, however, is sufficient to keep the roasting pits fully employed. Improvements continue to be made on the surface, which indicate that the mine is prosperous.

PACIFIC.—The shaft of this Plymouth mine has attained a depth of 370 ft. The new hoisting machinery is being rapidly pushed ahead. The double engine, which is now being erected, is as fine a piece of machinery of the kind to be seen in the State. It is reported that as soon as the development of the mine has reached the proper stage, the building of a 60-stamp mill will be commenced, with stamps of 1,000 lbs each. When the 50 stamps of the Pacific are added to the 80 stamps of the Empiro, Plymouth bids fair to head the list of mining towns in the county.

ZEMES.—Chapman Watkins has

to 25 ft. In the south end the ledge shows an average width of 8 ft of fine ore.

NOONDAY AND NORTH NOONDAY.—The 212 level etopes have undergone no change since last report. The haul amount of good milling ore is being obtained from that level. The 312 south stopes are looking well. The drift on the east prong of the vein is opening up a fine body of ore. The north stopes, 312 level, are looking well and furnishing good ore. The No. 2 vein, North Noonday, 412 level, continues to show a fine body of ore as the stopes are extended.

BENTON IRON.—*Centennial*, Oct. 20: We were yesterday shown, by Gus Millard, specimen of ore sent to him by Supt. Will Adams, Jr., of the Indian Queen, which is a beauty. Squared, it would be about the size of a brick. It is 1 of 6 pieces taken from the full width of the ledge. The assays of the ore, of which this specimen is about a 6th part, reach \$3,000.

NEVADA.

MERCURY MINE.—*Nevada City Herald*, Oct. 19: The construction of the new works at this mine is progressing favorably. The hoisting works are nearing completion, and will, when finished, without doubt be the finest in the county. The new shaft, which has 3 compartments, is down over the timbered mine far down as 280 ft. in a most finished manner. Adjoining the 3 cage compartments is a small shaft for the pump rods, and at the side are 20-ft ladders, with platforms at the bottom, by which the pumpmen or miners can ascend or descend if necessary. The engine to be used for hoisting will be 180-horse power, and will hoist 1,000 ft in one minute. The latest improved cages will be used. The foundation for the 20-stamp mill is completed, and is expected to have it in running order early next spring. The old works continue to run in full blast, and some very rich rock is at present being taken out.

GARFIELD MINE.—*Transcript*, Oct. 20: This mine, in Washington township, is being developed with most satisfactory results. There is a large quantity of good-looking ore already on the dump, and much more of equal richness is in sight and ready for extraction.

CO. LORE TREAT.—*Grass Valley Union*, Oct. 21: The tunnel of this company has cut the main ledge, which is large and appears of fair quality. An 8-inch stringer, which is an overlay of the main ledge, has also been cut through, which shows well in free gold—nearly every place taken out showing the color.

SABASTOPOL.—Next week this company will commence a crushing of 200 loads of rock from the mine. This rock is from the shaft which was culled below the drain tunnel, and from the second, or lower level, where the ledge is of good size, and the appearance of the rock is excellent. There has been no crushing of rock from the Sabastopol since the mine has been re-opened by the present company, and therefore no estimate can be made of the yield of the rock per load, but it looks well enough to give a good result.

CENTENNIAL.—A clean-up of 60 loads of rock on Saturday last, from the Centennial mine, gave a yield of \$4,490, or about \$70 per load. The ledge in the mine is looking as well as at any time, being of high grade. The incline is now 55 ft below the third level, which is 520 ft from the surface, and will be sunk to the full depth of 100 ft, when a new level will be opened. In sinking the shaft unusual work has been incurred, and the Trustees have deemed it best to levy an assessment to pay off an indebtedness for labor which has accrued in consequence. This is only the second assessment ever levied by the company, and will amount to \$3,000, which will pay off all indebtedness.

EMPIRE.—This mine, on Ophir hill, has been drained of water down to the 300 level. The pumps have been at work for 4 months to accomplish this, owing to a large extent of ground that was opened in the drift and stopes. A number of tributaries are at work taking out rocks from the levels that are drained. The mine is to be pumped out to the bottom (to the 1200) and the incline sunk deeper.

NEW YORK HILL CO.—The balance sheet of this company for the fiscal month ending October 15th, shows a profit on hand, after the payment of a \$10,000 dividend, of \$46,085.80. The dividend receipts for the month were \$27,024.05 from amalgam, and \$2,833.70 from sulphurets, or a total of \$29,916.75. There is a probability of another dividend being paid before the close of the present month. The stock of the New York Hill Co. has been listed on the San Francisco Stock Exchange, and is now subject to call.

YUBA CITY MINE.—*Transcript*, Oct. 22: Operations have been partially suspended at this mine since last Monday to admit of a new 5-inch engine being put in to run the hoisting works. Heretofore one engine has been found sufficient for hoisting and pumping, but as additional depth is attained greater power is found necessary. It is expected that both engines and the 10 stamps in the mill will be started Monday. This mine appears to be in a very prosperous condition and to be well managed.

A VALUABLE LEAD.—John Orissell and Wilson Foster have a valuable quartz deposit that is located in the mountain between the Yuba and Lindsey claims, Washington township. Three or four years ago they extracted some of the ore and left it on the dump, but the lot was carried off by Chinamen and crushed in hand mortars. A tunnel has just been run, cutting the ledge at a greater depth and it is found at present, holding having been experts say the rock throughout the ledge as far as prospect will mill about \$80 a ton, which will seem rather incredible to many, but we are assured it is a reasonable figure. From 500 to 600 tons of the ore are stripped and can be extracted rapidly by blasting.

YULCAN MINE.—*Grass Valley Union*, Oct. 22: The perpendicular shaft of the Yulcan mine, on New York hill, has reached a depth of nearly 200 ft. Quartz stringers are found going downward, which indicates near approach to a ledge.

NOTE.—The new skip at the Scotia mine was put in operation on Monday, and works to a charm.

SARGENT & JACOBS' MINE.—*Transcript*, Oct. 23: This drift mine at Quaker Hill continues to look well. There is a quantity of ore at present, holding having been suspended, as the pump cannot otherwise be kept running. With the first storm that comes work will be in full blast again.

YUBA G. & M. CO.—*Foothill Tidings*, Oct. 24: This company, above Washington, on the Yuba river, is about to start up its mill, with good prospects of being able to produce a large quantity of ore. This is the first time the mill and machinery have been put in, and it is working successfully; the new machinery works perfectly satisfactorily. Active work is in progress, and the recent bonding of the mine to P. & F. Coffin, of New Britain, Conn., and other Eastern capitalists, has given it a great impetus.

NOTE.—A New York capitalist, one of the new owners of the Southern Eureka and the Atlantic & Pacific mines will have this week in the interest of the owners. They have given the Orenville Iron Works an order for a 10-stamp quartz mill, on which the foundry is actively at work.

OREN MOUNTAIN NEW MILL.—*Quincy National*, Oct. 23: On Sunday we took a look at the new 60-stamp mill recently built by the Oren Mountain Co., above Crescent. It is a splendid piece of workmanship, and when fully completed will certainly prove very satisfactory to the managers of the huge mine. Sixty 300-b stamps, in a straight line, driven by a powerful Knight wheel under a

pressure of 400 ft, will certainly add grandly to the producing capacity of the mine, and the beauty of it is that the mine has enough pay-ore already in sight to keep it, with the 32-stamp mill already in use, in full blast for several years, and a certainty of an insupportable supply in the mountain below the works. Particular attention has been paid to economy in handling the ore, and after it is dumped by the miners into the chutes it goes through the stamps without further handling.

ARGENTINE MILL.—Mr. Heath informs us that his Huntington quartz mill is now on the road from Oroville, and that it will be put up as soon as possible after its arrival. The prospects are that Argentine will soon be a flourishing quartz camp, and will show what can be done by the energy of one man.

NOTES.—Loring and Leavitt still continue to extract the big bluffs from their Elizabethtown claims. They have got on a splendid lead and will be rich in "less than no time." M. Brauford proposes to the old Crescent tailings by anastasia process. They must be rich, and the venture should be a paying one. Work is going briskly on at Cherokee, near Round valley, and a big mine will soon be in full blast.

SIERRA.

DUTCH CO.—*Downsville Mountain Messenger*, Oct. 23: John T. Mason, long of the American Co. at Morrisonville, has taken charge of the Dutch Co.'s claims, at Loganville, and will immediately put them in working order.

NEW MINING CO.—The Black Jack mining and smelting company, whose property is situated in Jim Crow canyon, in this county, has reorganized in New York. The capital stock is \$250,000, in shares of \$2.50 each.

TRINITY.

TAYLOR FLAT NOTES.—*Cor. Weaver's Journal*, Oct. 23: Here at Taylor Flat operations in the mine are at present suspended, owing to the scarcity of water.

ATLANTIC CO.—This company is making the necessary arrangements for a vigorous prosecution of the work as soon as water comes, and are extending the ditch for the purpose, I understand, of opening up ground hitherto unexplored.

ITEM.—At Cox's Bar matters and things are progressing quietly and satisfactorily as I could learn. Mr. T. Price is running his drifting claim with a full crew, and I presume with the usual gratifying results.

NEVADA.

WASHOE DISTRICT.

BELZONA.—*Territorial Enterprise*, Oct. 20th, gives these official statements: On the 3000 level we have cleaned out the south drift, repaired the track and air pipe, and placed a blower in the station, so that work in the face will be commenced to-morrow. The diamond drill holes will also be continued. On the 2700 level we are running east and south from opposite the station to connect with the drift formerly run on the ore streak. This connection will give sufficient indication to show roughly prospect that portion of the mine where the ore was found.

CON. IMPERIAL.—The east crosscut, 250 ft south of the north winze, is in 54 ft, face in hard porphyry. The drift north from south winze, 2135 level, is in 44 ft. Our pump station at 600 level caved in Friday, which interfered with running the pump. In the meantime the Belcher is taking most of the work on the 2900 level.

SAVAGE.—During the week the shaft force was engaged in main shaft repairs as usual. The incline force was engaged in repairing the head of the incline, and the drift force continued the driving of the 10th level drift.

GOULD & CURRY.—The joint shaft is down 1,745 ft; 25 ft having been added since last report. There has been no change in the formation passed through.

HUNT & BELZONA.—The joint shaft has attained a depth of 1,745 ft. The Con. Virginia joint winze is down 128 ft; 7 ft having been added in depth since last report.

SUTRO TUNNEL.—During the week ending Oct. 22d, the head of the south lateral branch of the Sutro tunnel was advanced 80 ft; total length of the branch up to that date, 2,000 ft. The head has now penetrated the Exchequer ground a distance of 320 ft. and has yet a distance of 44 ft to go in order to reach the head of the Alpha ground. The air there is excellent and good headway is being made, there being an average daily progress of over 11 ft.

AURORA DISTRICT.

REAL DEL MONTE.—*Esmeralda Herald*, Oct. 23: During the past week the shaft has been sunk 13 ft, making its present total depth 330 ft. A delay of 23 hours the first of the week was caused by the bucket coming in contact with an obstruction in the working barrel of the pump, necessitating the bucket rods, which had to be taken out and straightened. Men are now at work excavating on the 750 level for the placing of a bob at that point. The excavation will be finished by the time the bob is ready to be put in position, which will be in a few days.

GRAND TRUNK.—Col. Ellis says that the Grand Trunk is a good, square, paying proposition, and he ought to know. He has just had 10 tons of rock crushed, and is more than satisfied with the result. He also says that the pulion is 996 fine, and that is pure enough for anybody.

MOUNT GRANT.—We learn from E. W. Bennett that the men at work in the Big Injun mine, Mount Grant, recently struck a ledge 3 ft in width that assays \$300 per ton. Should the ledge prove permanent, the owners have a fortune in the Big Injun. Mr. Bennett also informs us that he intends shortly to ship several hundred tons of ore from this mine to Pine Grove, there to be worked.

CHERRY CREEK DISTRICT.

MAOIE MINE.—*White Pine News*, Oct. 21: We learn from Hon. E. B. Dickenson that while the owners were doing the annual assessment work on the Maggie mine, a fire broke out on the 200 level, and the mine was closed north and adjoining the Oeneva, and promises to be a valuable property when developed.

EXCAVATOR CO.—This company still continues to haul ore to their mill. Several hundred tons have already accumulated. The repairs on the mill are completed, and they have commenced crushing ore, and we predict that in a short time we shall be able to report an output of 100 tons of ore.

STAR CO.—The tunnel of this company is now in 600 ft, and is progressing finely.

EUREKA DISTRICT.

A GROUP OF RICU MINES.—*Sentinel*, Oct. 21: Following up the West Fork of New York canyon we ran into one of the richest groups in the world, the Ricu mines, California, Bully Boy, Helena Mortimer, Uncle Sam Con, Hamburg, etc. The Dunderberg ore-raising is done on the west side of the New York mountain divide, but from whence they get their ore is over near the Connolly ground. The Connolly hoisting works are placed in a chamber stowed out many ft under the surface. They will remain up the mountain as the first shaft is sunk next month. The two Jerry Sullivan, Bill Higgins and Mike Murphy have commenced work on a lease in the Dunderberg. Heretofore they have done well with the same layout, and now they are expecting to do even better. The Bully Boy offers very flattering prospects to someone who would try it on a lease. The last parties who worked it did well, and no doubt there are men who will win away money out of it this winter.

CALIFORNIA.—At the shaft-house we found George Mendes in charge of his brother's (Joe) property, which includes a belt of claims aggregating some 600 ft in width, and including a spot in the center of the ore belt that is undoubtedly very rich. The old tunnel cut by the shaft some 30 ft from the surface. Accompanied by George we wandered in past the mine's house in westerly direction, thence southwesterly to an upraise of 75 ft. This was filled with ore of a pay quality, which had been stoped down. Descending by a ladder to the 50-ft level, we found that another drift had been run in a southwest direction, striking the same ore body. Another drift downwards and we landed on the 136 level. Several trips have been run on this level, and the shaft 125 ft. In working out thence southwesterly to an upraise of 75 ft. This was filled with ore of a pay quality, which had been stoped down. 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The Black Knot on Plum and Cherry Trees.

We have had several essays of late upon the growth of the plum and prune trees in this State and mention of the diseases which affect them. It is conceded that the trees are far more healthy in this State than at the East. The attacks of the curculio have never been reported from California plum orchards. Another foe of the Eastern grower is the black knot. Two years ago an Eastern orchardist sojourning in this State informed us that he had seen this black knot upon plum trees in Kern county, but we were not furnished with specimens of the suspected material and cannot of a surety say that his observation was correct. If any of our readers in that county can either affirm or deny the statement, we should be pleased to hear from them. As the growth of plum trees is engaging general attention, we have thought it timely to present some facts about the black knot, showing its general appearance and minute structure, so that our readers who are not familiar with the evil, may be prepared to detect it if it should intrude itself in this State.

The appearance known as the black knot is produced by the growth of a fungus, *Sphaeria morbosae*. The knots, says Prof. Farlow, are black and vary in size from half an inch to eight or ten inches and even a foot in length, and are about two inches in circumference. In some cases they completely surround the branch on which they are growing, but more frequently they extend only part way round; their course, when very long, being usually somewhat spiral around the stem. If they extend completely or nearly completely around the branch the portion above the knot dies. Frequently the upper part of the stem bends over so as to form a right angle with the lower part, and sometimes the portion involved in the knot forms an irregular coil. The surface of the knot is undulated, and flakes of bark not unfrequently adhere to it. In winter it is more or less cracked and broken open, and the inside is seen to be worm-eaten and hollow, except the woody portion of the stem, which passes through comparatively sound, generally on one side of the knot. Below and above the knot, unless the branch above has been completely killed, the stem is swollen for from half an inch to two inches, rarely for a greater distance. Under the microscope, sections show that, although the bark has been cracked in several places by the expansion of the stem, yet a new layer of bark has formed over the exposed portions. An abundance of threads (mycelium) are seen extending in streaks from the inner bark, or cambium, to the outer bark, or cuticle.

To show the outward appearance and inner growth of the black knot, we reproduce drawings made by the microscopist of the U. S. Department of Agriculture. Fig. 1 shows the general appearance of the knot as attached to the branches and twigs in the manner we have described. These masses of black substance give the tree a most sorry appearance. In the summer they are to a certain extent hidden by the leaves, but in winter the wretched appearance of a plum or cherry badly affected by the black knot is a sight which no tree grower who has seen it can ever forget. When the disease is well developed it is also quite apparent in summer time, for there will project here and there through the foliage, the dead twigs and branches laden with these unsightly excrescences. Neglected trees are a painful sight indeed.

Fig. 2 is a cross section of the mass of the knot, and shows how the branch is embraced by its enemy. Fig. 3 is an enlarged view of the outer surface of the knot, showing the little cups or conceptacles of which it is composed; and Fig. 4 is a view of the knot cut in halves, lengthwise, so as to expose these chambers or cups in which the fungus growth proceeds. The cups are enlarged so that their character may be plainly seen, although the general outline of the knot is of natural size; that is, there would be in nature a vast number more cups in a knot of the size shown. Fig. 5 shows one of these cups taken from its place in the knot, in order to show its shape more clearly, and Fig. 6 is a highly magnified view of the same body, showing the manner of cell-growth which prevails in it. These cup-shaped bodies are the seat of activity in the knot.

We have refrained from giving a technical description of this disease, because the general notes we have made, together with the engravings, will be enough to draw the attention of growers to any such growth which they may see upon their plum or cherry trees. When the black knot is really found to exist in this State, if indeed such an unfortunate day should ever dawn, it will be time enough to enlarge upon the intimate life-history of the fungus. We

will merely add a few considerations concerning the treatment of the pest, if it should ever appear. Prof. Farlow, of the Bussey Institute, of Massachusetts, remarks that from the knowledge that the knot is a contagious disease, caused by a fungus whose ascospores are ripened in midwinter, and whose mycelium does not ex-knots, and hearing in mind that the fungus is indigenous on certain of our native species of Prunus, the remedy is obvious. When a knot makes its appearance, the branch should be cut off a short distance below the slight swelling of the stem, which is found just below the knot. The question arises as to the best time for cutting off the diseased branches. We should say, cut them off whenever one sees them.

Some of our readers, who have observed the growth of the knotty excrescence on their grapevines, will enquire whether that ill-growth is not like, in character, to the black knot of the plum tree which we have described. This matter is not yet demonstrated. Mr. Moore, in his report to the State Horticultural Society last summer, stated that he had not been able to find any evidence of the existence of the true black knot fungus, or anything akin to it, although he naturally looked for such cause to produce the effect upon the bark of the vine, which is so similar to the knot on this



THE BLACK KNOT (*Sphaeria morbosae*) ON PLUM AND CHERRY TREES.

tand for more than a few inches below the bark of the plum. So far, therefore, the likeness between the two evils, is one of outward appearance only.

In the case of the dissatisfied stockholders of the Phil Sheridan mine, Judge Allen this week issued to defendants, J. M. Hinkle *et al.*, an injunction preventing the payment of money to Treadwell, one of the parties interested, and restraining the sale of some 60,000 shares until a final hearing of the case. The plaintiffs, H. S. Stone *et al.*, filed an undertaking in the amount of \$7,000, and the case was ordered to be heard within a month.

On the original Keystone mine a new shaft is down 210 ft. The superintendent says he shall make ladders and place them in the pump compartment for general convenience and safety in case of accident; also sheath the compartment to keep the air current good for drawing off the powder smoke. Great care is being taken to make the timbering of the shaft strong and durable, thus avoiding frequent repairs.

The Grand Prize mill has been shut down for want of ore. Milling will not be resumed until the ore vein is opened in the 600-ft. level.

Ledge in the Tuscarora averages three ft. and assays from \$60 to \$100 per ton.

Mr. J. MACDONOUGH, the well-known capitalist, has been elected a member of S. F. Stock and Exchange Board to succeed J. P. B. B.

Land and Land Laws.

We notice that in some parts of the State there are wild ideas still outcropping concerning sharp and arbitrary laws to reduce the size of landholdings. They seem to take the form of a yearning after some incisive law which shall decree the division of land acquired by individuals in the bonest way of purchase. It does not appear just in what way such a division is to be brought about, but it seems enough for present purposes to shout it must be done. Such shouts probably serve a purpose, else why should one strain his throat; but we cannot see how any such movement could be carried on without direct conflict with the rights of property and individual freedom which are decreed by our laws and constitutions.

We have often urged the advantage of having our vacant areas peopled with industrious homesteaders and producers, and we have cited proof to show that this is now the tendency of affairs in this State. There is a vast area of productive soil which the owners are trying their best to dispose of in small tracts and at most favorable rates to purchasers. The agents of these land

shall not see enterprise and labor toward improvement increased, because the owners will find them forced to make the land pay for itself. This will relieve the pressure of taxation somewhat from the general productive property of the State and will assure all that a just system of distributing public burdens prevails.

There are many wise principles involved in land holding and in the making of land laws which should be calmly considered and the subject should never be made the material for demagogic cries. Great Britain has long been vexed by the systems of land ownership and land laws which there prevail. We have nothing in this country which can be compared with the laws of primogeniture and entail. Our hardships are much more transient. Judging by the progress for the last 30 years in land division in this State, we may expect that the lifetime of another generation will see us well out of the woods. There are, however, several directions in which legislation may move toward hastening the desirable result. Some of these may be seen in the propositions which the latest English writer on the principles of property in land lays down as matters which laws relating to land should embody, as follows:

- "1. Land, as the root of the wealth of the community, should be dealt with so as to evoke its maximum produce.
- "2. To this end there should be nothing tending to preserve it in the hands of a hereditary caste, whether of large or small owners, but every facility should be given for its transfer from those who cannot use it properly to those who can.
- "3. Any system which tends to make the labor employed on land not fully productive should be discouraged.
- "4. The application of capital, which is saved-up labor, should be encouraged.
- "5. Large estates, implying great wealth, and consequently less inducement to production, should not be an object of legal favor.
- "6. So far as experience may show that there is no moral or economic objection, the law should rather seek to promote the division than that aggregation of landed property."

These points it would do for land doctors to pin in their hats, for they will, it seems to us, be found to cover the courses of right in these matters. They will be found to lie about midway between conservatism and the modern radical ideas which are being promulgated, and in most agitations the truth lies about half way between the new and the old. They all tend toward an equalization of burdens upon owners of lands, and causing all lands to sustain their share of the support of mankind. If these be enforced it naturally follows that the land will eventually come into the hands of those who can use it best, providing this tendency is not checked by arbitrary laws. In this country there is no such check and the right movement in ownership will surely exert itself if conditions favorable to it are assured.

It is safe to predict that all mooted measures to divide land honestly acquired will fail; in fact, they will never get beyond the platform of the political orator, or the print of his newspaper and pamphlets. But the truer measures, those which proceed in equity to adjust existing inequalities with due reference to individual rights, will advance and accomplish the desirable results within their power. Let all things be done decently and in order.

THE LOCATION FIEND.—There is not a mining community on the coast that is not cursed by the Location Fiend. That the blackmailer is bad, there is no denying; but for tricks that are mean and ways

that are contemptible, the Location Fiend is boss. Like the coyote, he is ravenous; unlike the coyote you cannot scare him off. With a copy of Copp's handbook and a tape line, he roams abroad and woe betide the old stakes that may come in his way. You might build another Chinese wall around the 1,500 ft. of ground upon which you had been at work for years and congratulating yourself upon having a clear title if not a good mine. Try to sell your claim and you will find that the Fiend had been around and swung the northwest quarter of his "Whangdoodle" through your Chinese wall, and can bring 10 good citizens to swear that they had seen him put up the location notice of the "Whangdoodle" long before you were born. It never annoys the Location Fiend to be cramped for room. He has been known to climb up one side of a pine tree and down the other, with a tape line between his teeth, in order to get all of the 300 ft. on each side of his ledge that the law allows. The Location Fiend never works a claim. He is too busy for that. He is the first at a stampede and the last to leave. You could not get up in the night and put up a monument on a new discovery without finding the Fiend hard at work staking off extensions. Lynching cannot squelch him—he was never known to die; but we would suggest as the most effectual remedy for his extermination, the enforcement of the stumpage law. Compel the Fiend to pay stumpage for the timber he has destroyed in making stakes on the public domain, and a pine board would soon mark his last resting place.

I X L District.

The Eureka *Sentinel* has made mention, on several occasions, of the above mining district; of its convenient location, and the wonderful facilities nature has afforded for the expeditions and cheap working of the enormous quantities of ore there discovered. By the arrival of Mr. John Sullivan, who is largely interested there, the *Sentinel* is put in fresh knowledge of how matters are going, and what the prospects now are for that camp. Mr. Sullivan left that section about a week ago, and has been sojourning on business at different points along the road, thus being longer than is usually necessary in making the trip.

Although the camp is suffering from the drawbacks which beset every newly discovered mining section, Mr. Sullivan thinks that I X L is now fairly on the road to prosperity. Of the New Ten-stamp Mill,

Mr. Sullivan says that it is a "sure thing." The San Francisco parties who are interested in the outcome of I X L have offered to put in a 10-stamp mill which will cost not less than \$30,000, if the outside parties, mine owners and others, will raise one-half the amount. Chas. Kayser & Co. have guaranteed to take the balance of the stock, and Mr. Kayser expects the Eureka parties who are interested in the mines there to take their proportion. There are many parties living in Eureka who are interested, more or less in I X L, and Mr. Sullivan has come down to see what they will do toward the mill. Although he has been here but a couple of days, he says all the parties have signified their willingness to do their part.

The location of the mill has not been definitely decided upon, but it is to be conveniently situated for the benefit of the entire camp. Mr. Kellogg, who owns three very fine properties, the Black Prince, Nos. 1 and 2, and the old I X L mine, has contracted to furnish Black Prince ore for the mill to run on for three months, and getting the same out at his own expense, and if his management should not prove satisfactory, financially, he is willing to turn over his valuable properties in that district to the mill company. This is a fair, square proposition on the part of Mr. Kellogg, and signifies his faith in the wealth of the district.

Taking all advices from I X L, they agree upon this one thing, that there is enough \$30 croppings within 20 ft. of the surface on the Iron Point, Bayfield and Black Prince mines, to run a 20-stamp mill 5 years. The assertion sounds big, but we have been assured of it so often, and by so many different parties who have been upon the ground, that we feel no hesitancy in publishing it to the world as a fact. Another beauty of I X L as a camp of worth consists in the fact that a salt marsh is only 15 miles away, and salt in any quantity can be put down at the mill for \$7.50 per ton. At Grantsville salt costs from \$35 to \$37.50, and the ores do not average, with 50 assays made, as much as I X L ores, which run over \$40 per ton. And again, at the head of the salt marsh is a range of hills containing copper and the other minerals—in fact, all the chemicals necessary for the treatment of ores in that district can be obtained close at hand.

The Mines.

The Bayfield is being worked by two shifts. The hoisting works are run by whim—horsepower. They are running for the east wall from the 150-ft. level, and are taking out some of the finest chloride ore ever seen in the camp, which will be tested in body very soon. An average is now here in Eureka. They have now on the dump 250 tons of ore.

The Black Prince Nos. 1 and 2 is being worked. Just now they are sinking a shaft. The ore from this mine runs from \$130 to \$135 per ton, chloride.

Chicago parties are expected along immediately to look at the Spar mine. They are sinking a working shaft upon this property, and if not sold to Chicago capitalists, ore hoisting will be in order.

All the workings of the Annie Allen mine have developed a solid mass of \$30 ore. Jim Allen, of Eureka, owns this property, and it is considered a good one.

Wm. Cox owns a mine over there, with a 4-ft. vein of bromide ore, which assays all the way from \$60 to \$300 per ton. It is known as the Estella. Mr. Cox is taking out immense quantities of ore.

The Iron Point tunnel is in 200 ft. At a distance of 180 ft. from the face a vein of \$60 ore was cut, which was 3 ft. in width, upward of one-half being gold. The workmen stoped out a little chamber and filled up the dump—40 tons of ore, of the value we mentioned above.

In the East Star is found more lead than in any other mine in this district. The owners have 40 or 50 tons of excellent ore on their dump.

Town and Buildings.

The town of I X L district is Roseville, and it was so named from being located in Wild Rose canyon. In summer the gulch is a mass of wild roses, with plenty of water and nut-pine timber all about.

TOURISTS lately arrived from the National Park bring information of the existence of another group of geysers, approaching, though not equaling, in grandeur those already famous. They are situated about 30 miles south of the headwaters of the Fire Hole river, and though they have been reached by a few tourists, are not generally known among those who have heretofore visited the Wonderland.

USEFUL INFORMATION.

Lubricating Oil.

The lubricating qualities of an oil are inversely proportional to its viscosity; the endurance of a lubricant is, in some degree, proportional to its adhesion to the surfaces forming the journal. An ideal lubricant, in these respects, would be a fluid whose molecules had a minimum cohesion for each other, and a maximum adhesion for metallic surfaces. Viscous oils adhere more strongly to metal surfaces, hence it is obligatory to use such thick lubricants on heavy bearings. With light pressures more fluid oils are admissible, and, in all cases, the oils should be as limpid as possible. Oils with great endurance are likely to give great frictional resistance, and in the endeavor to save gallons of oil, many a manager has wasted tons of coal.

The true solution of the problem of lubricating machinery is to ascertain the consumption of oil and the expenditure of power, both being measured by the same unit, namely, dollars. In some experiments recently made with castor oil, the friction was so great as to throw off the belt driving the machine. In regard to that oil it can be said, that its friction is too great for lubricating purposes. Sperm oil, bleached especially for the test, showed almost identical results with the unbleached oil. The result of bleaching does not seem to affect the anti-frictional properties of the oil, although it undoubtedly reduces its gumming qualities.

The friction of sperm oil is subject to sudden variations, which occur at certain temperatures, for the same sample of oil. The explanation of this lies in the fact that sperm oil consists of a large number of varieties of spermaceti, each of which is liquefied at certain temperatures, at which the oil is relieved of waxy, or at least, gelatinous particles, and becomes a more perfect lubricant.

SOAPS MADE FROM WATER USUALLY THROWN INTO SEWERS.—At Ivry-sur-Seine, in the Rue Champs Blancs, a manufactory of toilet soaps has prospered for a considerable time. This soap, which is perfumed with oil of roses, is obtained from the treatment of washing waters in Paris, which, instead of being run into the sewers, is now collected in casks. A manufacturer, guided by the practical indications of the chemist, M. Pierre Beauvalet, treats the suds in the laundries themselves, merely the fatty matters in the crude state being conveyed to Ivry. The process is as follows: To the soap-water obtained from washing linen a little sulphuric acid is added. The whole is then stirred up, and the fatty matter is let stand for a few hours, when it collects on the surface of the liquid. It is then collected in casks like those used by water carriers. In place of sulphuric acid sulphate of iron or ferruginous sulphate of alumina may be used, by the action of which a separation of fatty matter is obtained, which is precipitated in the form of an insoluble soap. After the action of these metallic salts the operation may be terminated by the addition of milk of lime.

TO MAKE BELTS RUN ON THE CENTER OF PULLEYS.—It is a common occurrence for belts to run on one side of the pulley. This arises from one of two causes. First, one or both of the pulleys may be conical, and of course the belt will run on the higher side. Second, the shafts may not be parallel, or exactly in line. In this case the belt would incline off to the side where the ends of the shafts come the nearest together. The remedy in this case would be to slacken up on the hanger bolts, and drive the hangers out or in as the case may be, until the shafts become parallel. This can be determined by getting the centers of the shafts at both ends by means of a long lath, or a light strip of board.

COMPRESSING AIR BY FALLING WATER.—In the *Franklin Journal* Mr. J. P. Frizell, C. E., gives the results of some experiments in compressing air by means of falling water, which go to show that this method of employing water power is not economical or practicable. The effective power obtained by the experiments never exceeded 52% of what it would have been if the water had been used directly to turn a wheel. Mr. Frizell's formula applied to a fall of 15 ft. give only 76% of efficiency, and with a fall of 30 ft., only 81%.

CEMENT FOR JOINTS.—When rubber plates and rings are used for making connections between steam and other pipes, leakage of joints may be prevented by using a cement prepared by dissolving shellac in ammonia. The pulverized gum-shellac is soaked in ten times its weight of strong ammonia, when a slimy mass is obtained, which in three or four weeks will become liquid without the use of hot water. This fastens well both to the rubber and to the metal or wood, and becomes, by volatilization of the ammonia, hard and impermeable to either gases or fluids.

HARDENING GLUE.—The only thing that will render glue perfectly insoluble, is bichromate of potash. If you add a little of this in solution to the glue, and after applying the glue to the article expose it to the sunlight, it will become insoluble even in hot water. Better expose for a good while, say an hour or so, to make sure that all the glue has become insoluble. —*Boston Journal of Commerce.*

A New Use for Steel Scale.

Messrs. Henry Porter, of the Bowesfield Boiler Works, Stockton, and John Thomas, late of the Acklam Iron Works, Middlesbrough, have recently introduced in England, an invention which is worthy of notice on account of its utility. They have established works at Bowesfield for the manufacture of paint from steel scale, for the protection of steel and iron in any position and in any climate. English papers state that the paint is finding much favor, having been applied by such firms as Messrs. Bolekow, Vaughan & Co., the Carlton Iron Company, Messrs. Pease & Co., the Tees Conservancy Commissioners, Messrs. Kirk Bros., Workington, the Moss Bay Iron Company, Workington, and others. Mill scale was certainly not altogether wasted before, but it can now be made much more valuable. Messrs. Porter and Thomas obtain from the steel works in the locality, the scale that falls from the steel as it is passing through the rolls, and this, by their special machinery, they grind, until it becomes as free from grit as flour, and it is then mixed with boiled oil and coloring matter. Two kinds of paint are manufactured—the first for the use above water, to prevent the structures from rusting, and this is named the anti-corrosive paint; the second is for use under water, to prevent fouling, and is termed the anti-fouling paint. It is stated that a portion of Redcar pier is painted with the anti-fouling paint, and there it has given great satisfaction after several months' trial. The anti-corrosive paint answers for iron bridges, railway rolling stock, coal and iron plant, iron houses, etc., ships above water lines, boilers, engines, etc. Ordinary paints, when applied to iron and steel structures, soon begin to crack and scale off, and do not prevent the formation of rust, which is so destructive to the stability of metallic structures. The anti-fouling paint answers well for ships' bottoms.

UTILIZING MILKWEED.—A writer in the *Providence Journal* predicts a useful future for the milkweed, which has heretofore been considered only a cumber of the ground. Its seed yield a finer oil than linseed; its gum can be used instead of India-rubber; and from its floss, a fabric resembling Irish poplin has been made; while the young shoots are used in the spring by some people instead of asparagus, which they resemble in flavor. Now, pertinently adds the writer, if uses can be discovered for the thistle and whiteweed, they may prove friends in disguise.

GOOD HEALTH.

Health and Pure Water.

EDITORS PRESS:—Noticing an article under the heading of "Good Health" in your issue for September 4th, copied from the *Scientific News*, which would tend to confirm many individuals in the idea that any water was wholesome to drink, I would add my testimony to the importance of using only pure water—the result of experience and experiment of several years past. First—We lived on the dry plains of Tulare county, in good health, for five years, until the boiler of the engine that pumped water from our 80-ft. well was sent to San Francisco; after which, there being no way to pump the well dry (it being 12 ft. in diameter and 10 ft. of water in it), we continued to use therefrom until we all began to have attacks of chills and fever. We could not believe it was the water, as that appeared pure and sweet. About the same time the family of a neighbor, who had lived on the edge of the plains, in good health, for many years, was all taken with chills and fever, erysipelas and other troubles that continued with great severity until they, to prove that their well was clean, attempted to pump it dry, a work which, though it was only a 35-ft. well 35 ft. deep, required three pumps with a relay of men to work them.

After failing to get anything but an abundant flow of clear water, they were about to discontinue the work with the impression there was nothing but the clear gravel, which could be seen upon the bottom, to be pumped out. To demonstrate beyond question that there was no sediment in the well, my neighbor took an iron scraper attached to a pole, and after placing the suction pipe of one of the pumps close to the bottom, he began to scrape among the gravel whilst the pump was being worked, when to the surprise of all there came forth the head-smelling remnants of decayed vegetable matter, such as fig leaves, peach seed, and such things as would naturally get into an open well. After this well was cleaned they had good health again. I then put a Hooker pump close to the bottom of my well under the 10 ft. of water, and brought out yellowish green liquid enough to poison a large body of water, the extract from which had been causing our sickness.

When we moved to Kern county, near Bakersfield, a place notorious for malaria, we used, in common with others, water from a well bored into the surface soil, which extends very deep, and, like others, suffered with chills and fever until about two years ago, when we began boiling all the water used for drinking, since which

time I have only had one attack of chills, and this was brought on by the use of unboiled water taken for the express purpose of testing the effect of it.

I could say more, but space forbids. The result is that (though I know improper use of food, especially much carbonaceous food, in this warm climate, or overeating, will and does in many cases cause bilious fever, chills and fever, etc.) the most prolific cause is the use of impure water; and I would be almost willing to insure any one to have good health on this island if they would abstain from greasy food, temperately use a grain and fruit diet, and drink no water that had not previously been boiled. Two or three of us are experimenting upon this subject, and the past summer our friends have not failed to notice and compliment us on our appearance of improved health, though the medicine we used to depend upon we have not needed to call for.

I was glad to see the article you published, "Starved to Death by Overeating," and am glad to thus see some use made of Dr. Tanner's very valuable experiment.

ISAAC B. RUMFORD.

Bakersfield, Cal.

Injurious Effects from Vulcanite Plates.

Samuel Sexton, M. D., in an article published in the *American Journal of Medical Sciences*, for January, 1880, states that vulcanite plates produce diseases that are more frequently the source of reflex aurial disease than any others worn. They have been in use for over 20 years, and their adoption is very general. The constituents of this are caoutchouc, the sulphur required in the vulcanizing process, and vermilion or the sulphide of mercury, used for the color it imparts. The quantity of the latter ingredient is believed to be equal in weight to both the other substances mentioned; accurate knowledge, however, is withheld by the manufacturers. The gradual disintegration of these plates, as they are worn in the mouth, liberates a salt of mercury whose poisonous effects are well known. But besides yielding a poison, they are otherwise injurious to health. Inquiries from dentists elicit the fact that at least one-third of all those who attempt to wear them experience great irritation of the mouth, an irritation that is frequently accompanied by hypersecretion of the buccal fluid. The sufferer usually lays aside the plate until informed of the necessity of becoming accustomed to its presence by uninterrupted use. Vulcanite is a non-conductor of heat, and the effect of its contact with the highly sensitive tissues of the mouth is to produce hyperemia and inflammation. Another source of injury is the very close contact of these plates, which is maintained by atmospheric pressure and may favor the absorption of their substances. —*Medical and Surgical Reporter.*

THE VIRTUES OF BUTTERMILK.—Few people know, says the *Country Gentleman*, the value of buttermilk. A proper and constant use of buttermilk will entirely cure the constant craving for stimulants to which many persons, from long use, have habituated themselves. Have it handy and when the appetite says whisky or other stimulants, drink half a tumbler of buttermilk; the craving desire will be satisfied, and the stomach will be much benefited and strengthened, instead of weakened. There are many good effects from a free use of buttermilk. It alone will often cure sour stomach, and permanently. The lactic acid needed by many persons is supplied by buttermilk much more largely than by any other known food or beverage. One vital and important use of buttermilk is the prevention of valvular ossification of the heart, from which, in this country, so many persons die, especially old persons. There are many other peculiar so-called heart diseases which lactic acid, if partaken of freely, prevents. The so-called fluttering or palpitation of the heart, consequent upon a disordered, dyspeptic stomach, can be entirely removed by a free use of buttermilk. There are many other unpleasant feelings thus cured, all of which have their seat in the stomach—melancholy, the blues, etc.

SAFETY FROM DROWNING.—The Sheffield *Telegraph* says that the Rev. W. Cowell Brown, Wesleyan minister, of Sheffield, has patented an invention which appears to be a simple and practical means of lessening the number of deaths by drowning. A chemical preparation is inserted in a portion of the coat, waistcoat, or dress. It does not add to the weight or in any way alter the appearance of the garment. The preparation is inserted between the lining and the cloth; in the case of a coat, it is placed on each side of the breast and up the back. The moment a man touches the water the coat inflates and he cannot keep his head under the waves. The invention was practically tested at the swimming-bath of the Sheffield Bath Co. recently. The inventor states that his apparatus, which would simply form an additional lining inserted in a portion of the garment, would sustain a person in the water as long as he could possibly endure the exposure. For 40 or 50 hours it would be effective for its purpose. In the event of a person losing consciousness, the lining in the back would form a kind of bed, and that in the breast a pair of pillows, against which his head would rest.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

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The Week.

We are in the very agony of the Presidential contest, and little else is heard but the shoutings of the captains and the noise of the wordy tumult. The strife is conducted with unusual intensity in this State, and for the present every other interest is absorbed. As they are now carried on our general elections are not edifying occasions; indeed, it is a question if the fierce and unbridled license of the campaign, the crimination and recrimination, the iteration and reiteration of shameless charges, and the wanton and cruel denigration of character, are not more demoralizing to the community than all other sources of evil combined. Our electioneering methods are not good; they have too rank a flavor of savagery. For the sake of our youths we hail the day that shall bring a more rational and humane system of choosing our rulers.

Of course business is not active in the city, though the indications are favorable for a brisk autumn trade. The condition of the State is unusually prosperous, and warrants our merchants and manufacturers in expecting an active and general demand for goods. It is encouraging to note that the various industries of the city have revived greatly of late, and there is good ground for the belief that they will steadily improve.

Mining in the State is generally prosperous. In many of the counties where placers and gravel deposits abound, active preparations are making for the approaching season of rain and snow. Matters on the Comstock are unchanged, and so far as the public is informed, there is no present prospect of any development of a paying ore body in any mine on the great vein.

In Oro Blanco, Arizona, there is quite an excitement in placer digging. Men are engaged with sluices and other means in taking out gold dust. The placers are said to be rich. Long

The Mining Situation.

The depression of the Comstock mines continues; indeed, their condition appears to grow worse from day to day. For months the hope of the public was centered in the group of mines at the north end, where there seemed a fair promise of developing an ore body; but thus far the explorations have discovered nothing. It is true there is still reasonable ground for expecting a body of ore in either one of the prominent mines at the north end, but from the present indications the discovery, if discovery there shall be, is likely to be distant. The condition in Union Con.—in which mine until lately the situation was most hopeful—is thus described: At the top of the winzes on the 2500 level, there are strong streaks of quartz running to the eastward; therefore, on the 2600 these streaks must be looked for to the eastward of where the winze will come down. It is to the eastward that ore must be looked for; and some authorities predict that the winze will be in paying ore when it strikes the 2600 level. The explorations on the 2500 level show that the apex of the great curve of the vein will be found in the Mexican ground. In Sierra Nevada and Union the course of the ore channel is northwest and southeast, while in Ophir it is northeast and southwest. This well-known fact leads to the conclusion that there must be somewhere a sharp curve in the vein joining together the two parts explored. Already enough work has been done on the two sides to lead to the opinion that the big bend and basin of the vein will be found within the boundaries of Mexican. It is reported that Comstock miners of great experience have declared that it is the strongest place they have ever seen on the vein, both as regards the character of the quartz and the general formation, and they expect to see it develop a fine deposit of ore.

The central mines—Savage, Norcross, Chollar and Potosi—present little to excite hope of the discovery of ore bodies. In the meantime they are assessed with frightful uniformity. This fact and their apparent barren condition, together with the general distrust of their management, seems at present to have placed them outside the pale of confidence. While this is the true condition of these mines, a strike of paying ore in either of them would at once revive the hope of the public. The condition of the mines at the southern end, particularly Belcher and Crown Point, is apparently more assuring, although the information respecting their operations which is given to the common stockholder is meager and perfunctory. It must be said, however, that the managers of these mines keep the public well advised of the levying and collection of assessments. The punctuality with which this chronic tax is paid is highly creditable to the patience and endurance of human nature.

In view of this posture of affairs on the Comstock it is a matter of surprise that so little attention has been bestowed upon the mining property in what are known as outside districts. Conspicuous among these districts are Bodie, Columbus, Eureka and Tuscarora, to say nothing of the numerous districts of Utah, Arizona, Montana and Idaho. Several of the most interesting mining properties on the coast are now in the course of development in the district of Columbus, which has already acquired substantial prestige from the splendid developments of the Northern Belle mine. The output of the Bodie mines has been large, and, from the developments in a number of its mines, is likely to continue for years. Hitherto our capitalists have neglected these outside properties, and have permitted them to seek investors elsewhere. At the present time several of the most productive mining properties on this coast are owned in New York city and give tone to the operations of its share market. We need only mention the Ontario of Utah Territory, the Homestake of the Black Hills, Dakota Territory, and the famous Standard of Bodie in this State. These splendid mines have already disbursed millions in dividends. For example: The Ontario was placed on the New York market about three years ago, at \$20 a share, and has declared about \$30 a share in dividends; is now quoted at \$30; the Homestake, which was first called less than two years ago at about \$21 a share, has since paid nearly \$7 per share, and is now selling for \$34 per share; and the Standard which has declared about \$21 a share in dividends, \$12 of which have been paid within a year and a half, sold in New York city less than two years ago at \$20 a share, and now sells at nearly \$30. These three "outside" mines, without referring to others of scarcely less importance, present a splendid record, and are calculated to inspire confidence in fissure veins yielding either gold or silver. Evidently these mines have been worked on business principles, and have not been gouged to make a boom solely for the advantage of a few reckless manipulators. Their history, as will be seen from our brief mention, shows clearly that mining property, when selected with intelligent care and managed with ordinary prudence and fairness, is at once the safest and most profitable investment that capital can find. The outside districts, and no less the gold-bearing quartz regions of California, offer the most interesting fields for investment.

J. H. LORING, Elizabethtown, Plumas county, took out \$3,000 from one set of timbers in his flume, and one day uncovered 25 ounces of gold

Old Mining Camps Reviving.

The general depression of industry in this State for several years has led to one good result. It has compelled hundreds of men to leave the cities and towns, where they had been vainly waiting for something to turn up, and go into the mining regions of the coast, strip off their coats, and go to work in good earnest. Only the hard men are impelled to take these heroic steps. They may have made mistakes; fortune may frown upon them; but their native energy and good sense prompt them to efforts which sooner or later fetch some measure of success. Much of the activity which prevails in Arizona is due to the presence of this class of men, whose experience and discipline in the mining camps of California and Nevada have fitted them for thorough, intelligent and successful prospecting. The revival of the long abandoned camps of this State is due in a large degree to the depressed condition of business and the stagnation of the mining share market, which had the effect of filling this city with idle men. Idleness led to destitution. The brave and hopeful turned their faces and steps toward the mountains, where the rock-ribbed gold and silver would reward their industry and enable them to shake off some loose habits and mend their fortunes. Hundreds of men from this city drifted into the mining counties of the State, and sought to earn a living out of some long abandoned placer, or to strike a fortune by the discovery of a valuable vein of quartz. The result of these efforts has been an unwonted activity in the gold mines of California, and the promise of an increased production from both gravel deposit and quartz vein. The depression of business, as sharp as the ordeal has been to many, has not been an unmixed evil. It has led to the revival of an important industry of the State, and has been the means, let us hope, of rescuing numbers of young and active men from the pernicious habits which grow out of idleness and the disposition to get rich by reckless speculation.

It is evident that quartz mining in California is, as a general rule, in its infancy, and that the full experience and large methods of the Comstock will be applied sooner or later. When that shall be done we may expect results as splendid as they will be unprecedented. We learn from the *Virginia Enterprise* that Mr. W. B. Shepherd, late Superintendent of the Utah mine, has just returned from a trip to many of the old mining towns of California, especially in Amador county, where, in the vicinity of Jackson, he saw several very rich quartz mines. It is the judgment of Mr. Shepherd that men who have a little money would do well in the old camps high up in the mountains, along and just above the snow line. At the time of the excitement caused by the discovery of silver in Nevada, many Californians who were prospecting very promising quartz veins gave up their claims and crossed the mountains. Few of these men ever returned, and their old mines lie about as left. Mr. Shepherd was also told of many gravel ranges that promise well for placer mines, but went to see none of these. He is of the opinion that our Comstock miners, with their enlarged ideas of mining, will yet take hold in the old camps of California and develop some fine mines. In most places the old, stay-at-home miners of California are still working in the primitive style of the early days. On most shafts is still seen the old-fashioned windlass. Few of the miners think of setting up donkey engines, and hand drills and black powder are still used in sinking shafts and running tunnels.

Gold and Silver Coin in the United States.

The Director of the Mint has furnished to the *Engineering and Mining Journal* the following valuable estimate of the amount of gold and silver coin in the country, Oct. 1, 1880:

Gold coin in the country,	June 30, 1879.....	\$236,490,693 00
Coinage of the Mints (15 months).....		66,723,499 00
Net import of U. S. gold coin (14 months).....		16,666,806 00

Total gold.....\$369,881,003 00

Silver coin in the country	June 30, 1879.....	\$112,050,985 00
Coinage of the Mints (15 months).....		34,776,437 50
Net import of U. S. silver coin (14 months).....		2,971,913 00

Total silver.....\$149,799,335 50

Total gold and silver coin.....\$519,680,338 50

Uncoined gold bullion in the Treasury.....63,040,840 00

Uncoined silver bullion in the Treasury.....5,557,759 74

Total gold and silver coin and bullion available for coinage.....\$593,273,833 24

The total gold and silver coin (\$519,680,338.50) is distributed as follows: In the treasury—gold, \$67,204,293.65; silver, \$72,454,600; total, \$139,658,893.65. In circulation and banks—gold, \$302,676,709.35; silver, \$77,344,735.50; total, \$380,021,444.85.

The ores of the Wood river mines cannot be sent to market, says the *Salt Lake Tribune*, as there are no teams in that country to haul them away. This, in itself, is the best evidence of the prosperity of Montana, as all the large freighters are busily engaged on freight for that

Back Ledges—Unexplored Region of the Comstock.

Lying west of the Comstock proper there are many quartz veins of large size, known as "back ledges," the most noted of which are the Santa Rita and the Cole. Of these ledges and that unexplored region, the *Virginia Enterprise* says: The Cole has yielded a considerable amount of good milling ore in times past, and those best acquainted with the vein say that there are still to be obtained better assays than at present in almost any of the mines on the Comstock. This ledge is about 100 ft. in width. The Santa Rita is over 100 ft. in width, and shows a great breadth of quartz that assays well, and is of excellent grain and appearance. Indeed, the side of the mountain is full of ledges of various sizes, all of which show more or less metal, gold predominating.

It is not a little curious that the ledges to the west should so long have been left unexplored. Here and there, in working the mines on the Comstock vein, drifts have been run a short distance into the rock forming the west wall, but none of these have been pushed far enough to reach any of the back ledges. Some years ago the cry of "Go east!" was raised. Since that time everybody has been going east. All who had been at work on the west or back ledges at once ceased operations. Without any good reason, people concluded that no bonanzas would ever be found to the west of the Comstock. The tunnels and shafts that had been started were abandoned, and those engaged in prosecuting work upon them turned their attention to ground further east, and to the northward and southward. Thus, nothing more is now known of the ledges to the westward than was ascertained by surface explorations made years ago.

This being the case, it would certainly seem to be worth while to start a tunnel at some convenient point, and push it far enough west to cut several of the back veins. At least one tunnel should be so run. It might be done at small cost by several interested parties combined.

Such a tunnel could be started from any level of the Comstock that might be thought most favorable or convenient. Sooner or later a tunnel of the kind will be run, as one of these days our people will determine to see what is back in the mountains.

Several of the old tunnels that were run into the mountain to the west of the Comstock years ago, are now owned by the Virginia City and Gold Hill Water Company. Although not a drop of water is now flowing from them, for some reason men have recently been set to work at retimbering and putting the principal of these in good condition. As no water now flows from these tunnels, they are no longer of any use except for mining purposes. They would be useful for air and other connections, and as they are now being put in shape, it may be that a movement is being made to the west; indeed, for aught that is known to the outside world, a tunnel may now be well on into that west country—that *terra incognita* of back ledges.

A Patent Contest Ended.

A dispatch dated Washington, Oct. 22, 1880, says one of the longest and most bitter contests ever known in the United States Patent Office was ended yesterday by the issue of a patent to Richard F. Knox and Joseph E. Osborne, of California, for a process of reducing "mercury ores." The application for this patent was filed by Dewey & Co. in April, 1875, and the opposition to the inventors' claim has been constant and aggressive, both in the United States courts and in the Patent Office up to the issuance of their patent. The opponents of the patent have defrayed the heavy expenses of the long contest by eminent counsel against the issuance of the patent, as it covers a process for reducing the turras or fine ores of mercury, which is of great importance in the future of quicksilver production, and has already been largely used both by the inventors and by others, who will now have to arrange for its further use with the inventors, or stop.

During the progress of this case, we have associated with us some of the best legal talent in Washington, and the papers which we have on file in our office and in Washington relating to this case, will aggregate some thousands of pages.

The patent was received by Dewey & Co. and delivered to the inventors this week.

A QUARTZ ledge was discovered on Pine Creek mountain, in Union county, Or., on the 2d of Sept. There have been already six claims located of 1,600 ft. each. It is a well defined ledge, cropping out of a solid granite mountain, and contains galena, silver and gold. Some of the rock has been taken to Baker City, and assayed \$40 to the ton, and some to Union, which turned out \$100. The greatest excitement prevails over the discovery.

THE Salt Lake *Tribune* of the 23d inst. says that the mines bonded recently by Col. R. H. Rogers—I X L and Northern Light, Caribon, Idaho—are said to look well. The Northern Light has 9,000 tons of \$15 free-milling gold quartz in sight, and the I X L is developing

Home-Grown Tea.

Now that tea growing is being advocated as a home industry, and the wise in such matters urge the housewives in States where the tea plant thrives, to grow tea in their gardens as they do the fragrant herbs for kitchen use, it is of interest to note the part which the ladies of Japan play in tea production. Our engraving is taken from the Report of the Department of Agriculture, and was made from a painting by a Japanese artist, which was procured by our Government. The scene is in a foothill district, and shows several incidents of the Japanese method of culture. The employment of the ladies as pickers is, however, the chief point we would note. We do not know how these Asiatic ladies deport themselves while engaged at this task, but we submit that if the American housewife should marshal her home forces and go out into the garden for an hour's tea picking, there would be a merry time of it, and much enjoyable talking would be done while the leaves were gathered. Neighbors, too, could join forces and have fully as good a time chatting over tea picking in fine weather as they can tea drinking at other seasons. There could be just as much solid information of neighborhood affairs exchanged across a tea table. Perhaps if home tea growing were urged upon the ground of its social features, there will be unusual interest excited.

The ladies shown in the engraving very properly have a male assistant to do the heavy work for them. They pick in small receptacles and empty them, when filled, into the large hamper which is seen upon the left of the house. The melancholy individual who is running along the path on the lower ground with his baskets, is on his way to carry home the tea which the ladies have ready for him. The method of plucking the tea leaves is of interest, and may be of value to those who are now testing tea making with the plants now growing in this State. The smaller engraving shows that only parts of the main leaves are plucked for fear of injuring the new buds if the leaves should be pulled off at their union with the twig. Thus a woman plucks off the terminal leaves *a*, *b* and *c*, at the line marked 1, using the thumb and forefinger of the right hand. In Japan, the picking stops at this point, but in India, *d*, *e* and *f* are torn off part way down at the lines marked 2, 3 and 4. Thus the Japanese pluck three leaves and the East Indians six leaves. The operation of picking is one of great nicety and importance.

GROWTH OF AMERICAN RAILWAYS.—One of the most instructive statistical statements contained in Mr. Poor's latest volume will be found in the following tabulation, showing the growth of the American railway system from its small beginning in 1830 up to the close of 1879:

Year.	Miles in Operation.	Year.	Miles in Operation.
1830.....	30	1871.....	60,283
1835.....	1,098	1872.....	68,171
1840.....	2,818	1873.....	70,278
1845.....	4,834	1874.....	72,883
1850.....	9,821	1875.....	74,098
1855.....	18,374	1876.....	76,908
1860.....	30,835	1877.....	79,147
1865.....	35,085	1878.....	81,841
1870.....	52,914	1879.....	88,121

The railways of the world probably stand today as follows:

	Miles.
Europe.....	98,275
United States.....	88,121
Rest of the World.....	25,000
Total.....	209,396

The Philadelphia Record deserves great credit for its successful efforts to break up the sale of bogus medical diplomas, which of late years has disgraced that city. The fact was well known that "Dr." Buchanan and others were engaged in this nefarious traffic; but it was plied with impunity because of the difficulty of obtaining positive evidence of the sale of diplomas. This evidence the city editor of the above named journal by a clever subterfuge succeeded in obtaining; and the presentation of this evidence in court has resulted in the forfeiture of the charters of two of the diploma mills.

The "Jeannette"—Views of an Arctic Explorer.

A cable dispatch to the New York Herald from London, Oct. 25th, gives the following letter from Admiral Sir Richard Collinson, respecting the probable situation of the *Jeannette*:

"I do not think that there is much cause for anxiety. You may depend upon it that if Lieut. De Long reached Wrangel Land he would push as far north as he possibly could, knowing the value and importance of any observations he might make in this locality during the winter. In the event of an accident happening to the ship, we know he was only to cross a strait 110 miles wide to bring him to a kindly disposed people, who showed hospitality to the crew of the *Vega*. It would, perhaps, be desirable to request the kind influence of the Russian government. I do not think the westerly current, encountered by Tegethoff, will extend so far to the east, and if obayed by ice the *Jeannette* would make her escape by way of Behring's straits, where we know the ice comes



JAPANESE LADIES PICKING TEA ON A MOUNTAIN PLANTATION.

to the southward in great quantities. There is another condition for which it may be desirable to provide, viz., that the *Jeannette* failed in reaching Wrangel Land, and may have been induced to follow the opening caused by the equa-

who, dazed by the glitter of big assays, forget that high-grade ore is always scarce and extremely variable in both quantity and quality; and that it is expensive to mine since it occurs only in small veins, and is expensive to mill



METHOD OF PLUCKING TEA LEAVES IN JAPAN AND INDIA.

torial current to the north of Point Barrow. Had I been in a steam, instead of a sailing ship, there is no doubt I could have penetrated much farther to the northeast than I did in 1850. Should Lieut. De Long have taken this route, the probability arises that he may make his escape from the ice by the Mackenzie river. It therefore appears to me desirable that the Hudson Bay Co. should be asked to give instructions to their traders, who traffic with the Esquimaux, to announce that a reward would be given for information of the ship being seen on the coast."

since only a small quantity is treated daily. Ores of a low grade are far more uniform in quality and occur in infinitely larger quantities than rich ores, while the large amount which can be mined and milled daily reduces the cost per ton, and leaves, if not always a larger, yet usually a far more certain profit. As a general proposition it will be found that a mine yielding \$5 a ton net profit from a \$10 ore, is a safer and better investment than one yielding \$15 profit on a \$50 ore, or than one yielding \$50 profit on a \$150 ore.

A MINE ON FIRE.—The Austin Reveille, of Oct. 22, says a very serious if not fatal accident occurred at Wardell's mine, near what is known as Moor's Side-track, 12 miles east of Wells, on the Central Pacific road, on Wednesday. By some unknown means the timbers in the shaft, which is sunk to a considerable depth, took fire, and the shaft at last accounts was still on fire, notwithstanding the most strenuous efforts to subdue the flames. Three miners who were at work below are still in the mine, the shaft mentioned being the only means of egress from the works, and there is every reason to believe that they have perished.

MAIMOTH CASTING.—The largest casting ever made in this country was cast lately at the Black Diamond steel-works of Park Bro. & Co., of Pittsburgh. It was a solid anvil block, 11 ft. high and 8 by 10 wide, intended for a 17 ton steam-hammer, and weighed 160 tons. Seven hours were consumed in running the metal into the mold, and it will be four months before the casting is cool enough to move. The hammer will stand 34 ft. high, and will strike a blow of 20 tons. Its total cost was \$52,000.

BRANCHES of the Land League are to be established in England and Scotland. They are to demand a confederacy of the three Kingdoms in place of the Union.

Important Decision on a Mining Survey.

On the 27th inst. the Secretary of the Interior rendered a highly important decision in the matter of the surveys of the Beatrice and Monitor mines in California, claimed by the Ivanpah Con. M. and M. Co., on the appeal of Julius A. Bidwell from Commissioner Williamson's instructions of Aug. 16th to the Surveyor-General of California, and a letter recently prepared by the Commissioner, directing the Surveyor-General to approve and deliver plats of said surveys to the proper parties without further delay. The Commissioner, in transmitting the appeal to the Secretary, requested him to dismiss it and to approve the recently prepared letter to give explicit authority for him to dismiss all other like appeals, and to direct the Surveyor-General to refuse to receive any protest or appeal relative to the survey of a mining claim, except from the party entitled to such survey. The Secretary, in reply, holds that under his decision concerning the surveys of the Occident, Orient and other mines, in August last, no such appeal should have been accepted or forwarded by the Surveyor-General, if that officer had received instructions in accordance with said decision; but, having been received and forwarded, it should have been promptly dismissed by the Commissioner. He continues: "The practice of permitting adjoining claimants of persons not applicants for the survey in a case like this to protest, object, file evidence and appeal, where no case in which any question of their right of possession or to a patent is involved is before this Department for decision or final action, is, in my opinion, altogether wrong, and the sooner it is entirely discontinued the better it will be for all parties concerned. Very proper objections can be made in the survey when-

ever it is put or offered to be put in evidence in support of an opposing or conflicting right or claim. The anticipation of such objection before the plat is offered in proof or support of claims, seems to me a little worse than useless. I do not think it necessary for me to approve your letter to the Surveyor-General, for it is not at all likely that he will refuse to obey your instructions. I will say, with reference to letters of that character directing the approval of such surveys, that they are not to be considered in any way as decisions affecting the merits of the cases. They will not preclude objections to surveys presented in support of applications for patent or adverse claims, and the approval of surveys, by direction from your office, are not to be considered as having any more or greater force or weight than ordinary approvals of survey of mining claims by the Surveyor-General, without reference to your office or direction therefrom. I think that the decision of Aug. 9, 1880, in the case above mentioned, gives you full authority to do what you request me specially to direct in this matter. If special instructions to Surveyor-Generals themselves are deemed necessary, that decision is ample warrant for your issuing them."

A QUARRY OF VALUABLE MARBLE.—There may be seen at the hall of the State Mining Bureau, on Pine street, samples of marble from a large quarry on the bank of the North Fork of the American river, a short two miles from the C. P. railroad station, at Clipper Gap. We learn that the character of the quarry was determined by Mr. Henry G. Hanks, the State Mineralogist, who, while on a recent tour of observation in the mountains of the Sierra Nevada, saw the splendid deposit outcropping to the height of 300 ft. The owner had been thoughtlessly burning it for lime. An examination of the deposit led Mr. Hanks to pronounce it marble of a fine quality. The material is of a delicate dove color, beautifully mottled, and is easily susceptible of a high polish. The quarry is advantageously situated. The river flows at its base, offering an abundance of the cheapest power, and quartz sand abounds in the vicinity. With such rare facilities for the manufacture of marble wares, this fine quarry ought to be speedily utilized.

A LARGE cave has been found in the Blue Belle mine near Ward, Nev.

Candelaria.

A correspondent of the Virginia Enterprise, writing from Candelaria district, says:

This is without doubt the roughest and most uncomfortable mining camp in Nevada. The houses, what there are of them, are poorly built, and the cold wind that has been blowing for the past few days goes through them as easily as it would through a sieve. A great many people still live in tents. Wood costs \$20 a cord, and is scarce and poor at that. It takes a capitalist to keep a fire going here. Water retails at five cents a gallon, and is hauled in by wagons from Columbus—eight miles. This water is not very good, being impregnated with alkali, but the average Candelarian doesn't care much for that.

Pickhandle Gulch.

This is the name of the real mining town of the section, being located in the ravine directly below the mines. The people of Pickhandle, however, object to the name, and want it to be called Metallic City, after the style of the Slippery Gulchers, who insist upon Gold Hill, and the citizens of Pizen Switch, who are indignant if not addressed as coming from Greenfield. The Northern Belle hoisting works, the most important in the district, are about half way between the two towns. The town of Pickhandle is something like a mile from Candelaria, but the people get their mail at this place. Joe Pinschower, formerly of Virginia, carries the mail between the two places.

The Mining Interest

Has had a bad hackset by the way in which the Mt. Diablo has turned out. Great things were promised for this claim, but the ore which has come from it has not milled up to the standard of expectation, being only \$90 a ton, and the stock has consequently dropped from \$15 to about \$5. The people now say that there is not enough ore in the mine to keep the mill running two weeks longer, and the chances are that the people are right. There is another reason for the present depression. The Northern Belle Company, which virtually controls the camp and all kinds of business in it, seems to be bent upon giving the place a "black eye" upon every possible occasion. For that reason business men who would be willing to invest and help along, taking their chances with the rest, are discouraged and keep out. The Northern Belle boarding-house, away up the hill, is another deadener to the place. Every man in the employ of that company is compelled to board at that particular house, and to pay \$40 a month for his board, although better accommodations could be obtained at lower prices at other places. As a consequence, the men scarcely ever come down town in the evening, and as they have no inducement to bring their families here, the money which is paid out by the Northern Belle never gets into circulation here. Miners are paid \$4 a day in all the mines.

Dull Times

Are complained of by all classes of people. This is because everything is overdone. There are too many sellers and not enough buyers. But everybody is looking hopefully forward to the time when the railroad will connect us with the outer world. This is without doubt one of the camps to be benefited by the railroad. The teamsters who haul into this place do not stop over night, as they do in other places, for the reason that it would cost a small fortune to supply their mules with water. They either push on to Columbus or go back to Belleville, and thus the money they would drop here goes to benefit other places. The railroad cannot possibly hurt us, and will help us in many ways. This entire country is filled with quartz that will go from \$17 to \$53 to the ton, but, owing to the great expense of wood and water, it doesn't pay to mill it yet. When it will be possible to transfer this ore to Walker Lake at the cost of \$2 or \$3 a ton, you will see Esmeralda county loom up in the most surprising manner.

This is not a good camp for a man to come to with the expectation of getting employment. If any one intends coming, they should bring their own bed and blankets. Lodging and room rent are very high, though meals cost no more than in the Comstock. The restaurants set up very good grub.

The system of mining in Cottonwood has undergone a change for the better. Our people seem to have settled down to the opinion that mining is a legitimate business, and are acting accordingly. The mines are being thoroughly developed by tunnels, shafts and levels, and the mania for shipping every ton of ore as soon as exposed, is about over. The City Rock, under the management of Lem Colbath, was one of the first, if not the first, in this district, to start the reform, and now most of the mines are worked on that common sense and business sense principle. Little Cottonwood is not exactly booming, but it is in better tone and spirits than for years past.—Salt Lake Tribune.

Mr. GEORGE DAILY, whose departure from Leadville we recently chronicled, says the Boston Economist, is now on a visit to Boston, the guest of Dr. H. E. Townsend. Mr. Daily, as most of our readers probably know, is largely identified with the mining interests of Colorado. He is the consulting engineer of the Brittonstone group of mines at Alpine, the general manager of the Silver Mountain mining company's mines, at Ten Mile, and part owner in the Gilpin mining company, whose prop-

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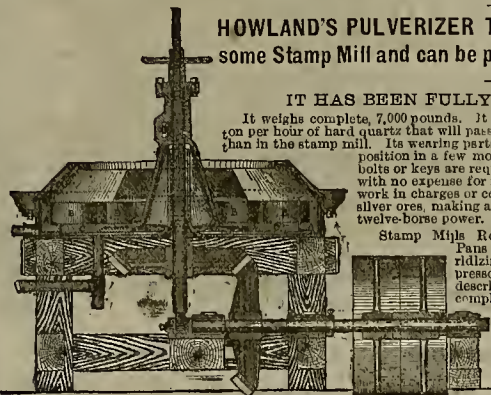
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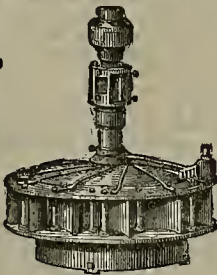
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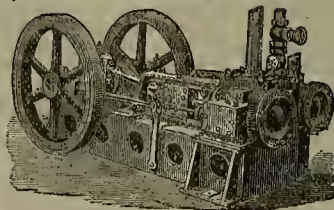
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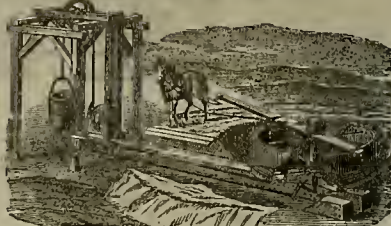
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

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FOR WEEK ENDING OCTOBER 5th, 1880.

233,136.—ORAIN MEASURE.—C. S. Bell, Amador, Cal.
233,063.—MEDICINAL FOUNTAIN.—H. J. Boughton, Albany, Oregon.
233,139.—ORE CRUSHER.—O. F. E. Brinckmann, Oakland, Cal.
233,086.—PROPELLER SAIP.—R. M. Freyer, S. F.
233,105.—MACHINE FOR MAKING PAPER PULP FROM WOOD.—R. B. Lane, Stockton, Cal.
233,175.—ENGINE GOVERNOR.—A. O. Waterhouse and B. B. Brewer, Sacramento, Cal.
233,129.—STOCK CAR.—L. Woodruff, Ellensburg, Oregon.

FOR THE WEEK ENDING OCTOBER 19th, 1880.

233,321.—EGO CARRIER.—John Brice, Alameda, Cal.
233,473.—DRYING FRUIT.—J. W. Cassidy, Petaluma, Cal.
233,384.—HORSESHOE NAIL.—T. Doyle, S. F.
233,405.—WATCH CASE.—F. Ephraim, Bodie, Cal.
233,520.—REDUCING ORES.—R. F. Knox and J. Osborne, S. F.
233,524.—HAY FORK.—J. W. Livermore, Kingsbury, Cal.
233,432.—AIR COMPRESSOR.—J. B. Pitchford, Gold Hill, Nev.
233,434.—PIPE COUPLING.—E. Riley, S. F.
233,485.—FIRE GLOBE.—O. P. Ross and P. Vallejo, Bristol, Nev.
233,338.—ORE CRINDER.—J. H. L. Turk, S. F.
233,449.—CAN FILLER.—J. West, Westport, Oregon, and R. D. Hume, S. F.
233,453.—PURIFYING OILS.—A. W. Winter, S. F.

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DOUBLE-WALLED GLASS FISH GLOBES.—G. P. Ross and P. Vallejo, Bristol, Nev. Patented Oct. 19, 1880. No. 233,435. This invention relates to certain improvements in the construction of globes or transparent vessels which are intended to contain gold or other ornamental fish; and it consists of a doubled-walled chamber, having an intervening space or spaces within which various colored fluids may be placed, so as to give a peculiar or attractive appearance to the contents of the globe or vessel. By this construction the globes may receive any tint desired, either to correspond with or contrast with the tint of the room in which the fish are to be kept, and the fish or other contents of the globe or vessel will be tinged with the color used by being seen through it.

WATCH CASE.—Ferdinand Ephraim, Bodie, Cal. Patented Oct. 19, 1880. No. 233,405. This invention relates to an improved construction of watch cases by which dust and moisture may be prevented from entering the case and injuring the works of the watch. Much damage is done in a very short time to watches, carried by persons engaged in occupations where there is much dust, by fine particles of dirt which get between the cases and gradually reach the operative parts of valuable watches, and in a short time destroy the usefulness of the time-piece. This device consists in making a rim to which the cases are hinged, so that a groove is formed around the periphery of the cases outside, and this arrests the dirt and prevents it entering the watch.

CAN FILLER.—J. West, Westport, Oregon, and R. D. Hume, San Francisco, Cal. Patented Oct. 19, 1880. No. 233,449. This invention relates to certain improvements in that class of apparatus which is employed to mechanically pack and fill the cans in which meat, fish or other solid substances are hermetically sealed for the markets; and it consists in the employment of a carrying-belt, operated by an automatic pawl and ratchet whereby the material is carried forward into a chute, through which it is led to the shaping and compressing cylinder; and in combination with this chute, the employment of a pair of curved shearing knives, which cut the material to the exact cylindrical-shape necessary to enable it to enter the can.

AIR COMPRESSOR.—John B. Pitchford, Gold Hill, Nev. Patented Oct. 19, 1880. No. 233,432. In this air compressor the improvements consist in providing a peculiar cut or split metallic ring, having a suitable point and covering an annular discharge-opening, said ring answering for a discharge-valve or outlet for the air compressed within the cylinder, and closing by its own elasticity the discharge port so that the air shall only enter at the inlet valve or valves. By discharging the discharge-valve in the manner described, a large or free outlet for the air is obtained without the undue friction which would be incident to the working of a large slide valve.

PIPE COUPLING.—Eugene Riley, San Francisco. Patented Oct. 19, 1880. No. 233,434. This device consists in the formation of a hollow cylinder of wood of such an exterior size as to

fit within a sleeve, and having an interior diameter which will just admit the size of the pipe to be used. These cylinders may be burned or otherwise formed at the shop in quantity, and delivered at any point where pipes are to be laid, while the pipes and the exterior sleeves may be delivered at the same point in their ordinary condition, and without any previous preparation.

PROCESS AND APPARATUS FOR REDUCING MERCURY ORES.—Richard F. Knox and Joseph Osborn, San Francisco. Patented Oct. 19, 1880. No. 233,520. A furnace is provided for reducing fine or pulverized ore which will not choke up, and in which the ore is moved and stirred by gravity, while at the same time it is retained, the whole mass is divided into thin bodies, and is in a favorable condition to be effectively operated on by the heat.

PROCESS OF PURIFYING FATS AND OILS.—A. W. Winter, San Francisco. Patented Oct. 19, 1880. No. 233,453. This process relates to bleaching, refining and purifying of tallow, lard, oil, stearic acid and other dark animal oils and fats, and also of certain vegetable oils, in an economical manner, without the use of acids or any poisonous or deleterious chemicals.

A Deserved Tribute.

It is well known to most of the citizens of San Francisco that a bold attempt was made through the Legislature of 1878, to work an almost total confiscation of a large tract of land in this city by forcing upon the owners of said property a pretended "improvement" in the shape of an expensive and needless cut through the hills of the Potrero, to be known as Pennsylvania avenue. The work was similar in character, but far more costly and disastrous, and much less needed than the Second St. cut through Rincon hill. The efforts of the property owners most nearly concerned seemed to be unavailing to stay the progress of the work of spoliation, when Mr. Peter T. Seculovich, of 504 Stevenson St., set himself vigorously to work, and at much cost of labor, time and money, organized an association for the purpose of united action against this bold attempt at confiscation by outside speculators. Success finally crowned his efforts by securing the passage of an act repealing the infamous act authorizing said pretended improvement. The property owners interested made a substantial demonstration of their gratitude for the services of Mr. Seculovich, by coming together, at his residence, on the evening of October 11th, and presenting him with an elegant gold medal, a pair of gold-mounted pebble eye-glasses, a volume of the Legislative Reports, containing his act of repeal, and a copy of Webster's Unabridged Dictionary. The medal is a very costly and elaborate one, containing on the one side the words, "veni, vide, vici," with a farther inscription detailing at length the service done and the fact that the gift was from the members of the above named association. On the reverse side is shown the outlines of the North and South American continent, upon one side of which is a miniature view of Perasto, Austria, his native city, and on the other side the Palace hotel, as emblematic of San Francisco, with a ship wending its ocean way around the "Horn," by which route Mr. Seculovich reached this coast. The presentation was made by Mr. L. J. Hardy, a member of the Legislature, who took a decided interest in the act of repeal. His eloquent and fitting remarks were properly responded to by the happy recipient of the valuable and justly deserved gifts.

INDUSTRIAL LITERATURE.—"Spons Encyclopedia of Industrial Arts" is still appearing in parts of 60 to 70 pages each. Parts 12, 13 and 14, which are the latest issued, cover the following subjects: Coffee, cotton manufacture, drugs, dyeing and calico printing, electro-metallurgy and explosives. Each of these topics is the subject of a comprehensive illustrated essay by some writer who is practically conversant with the matter of which he writes. In fact, so complete and detailed are these essays, that each would serve well as a hand-book for those seeking knowledge of the specialty treated. When such treatises are collected into an encyclopedia, the result is a work which it would be hard to improve, and this is the quality we would accord to Spons' encyclopedia. We know of no work which contains so rich a store of varied information on industrial topics.

THE PRETTIEST DINNER TABLE.—At the Cincinnati exposition, the other day, a prize was offered for the prettiest dinner table, and it was given to a man who spread a round table about eight ft. in diameter for a dozen guests. The center decoration was a round plot of fern leaves with stocks of lily of the valley in the center; radiating from the ferns were star rays of pink laid on green, and between them were a trefoil, a horseshoe, a fan, a pipe, and a slipper in flowers. The huton-hole bouquets were of rosebuds and lilies of the valley, and the ladies' bouquets were of the same flowers. The table was covered with satin damask, and the glass, china and silver upon it were worth about \$2,000. The hills of fare were of tinted silk, painted with wild flowers and landscape panels.

The Nicaragua Ship Canal.

The irrepresible projectors of this scheme have just published in pamphlet form the report of the Executive Committee to the members of Provisional Inter-oceanic Canal Society on the present condition and prospects of the Nicaragua canal. Among other statements the report sets forth the following: As soon as the concession was made by the Nicaragua Congress this committee sent one of its members to London and Paris to confer with financial firms. Satisfactory interviews were had with many leading financiers of the world. It is generally conceded that subscriptions in this country of, say \$15,000,000, to the Nicaragua canal stock, and guarantees of protection by the United States, which, indeed, is fully provided for in the stipulation treaty with Nicaragua, would secure in Europe any amount necessary for the completion of the canal. Its comparatively small cost will enable the company to earn paying dividends upon rates of toll that would be ruinous to the Panama enterprise, without crediting any amount for passenger business, and without an allowance for the growth of business and population of this Pacific States in the interval of canal construction. We have found a traffic actually awaiting its opening, amounting to 3,706,426 tons, about most of which there is very little room for dispute or doubt, but the committee prefers to adopt 3,000,000 tons as the basis of estimates, while still omitting all passenger traffic, and not making reference to the valuable land grants. A charge of \$2 per ton for canal tolls, and of 50 cents for all other charges would give a business of \$6,000,000 received; \$75,000 for expenses of a business of \$6,000,000 net gain, or 8% on \$75,000,000. A business of \$2,000,000 would, after deducting for expenses, net nearly 5% on the capital invested.

California Mining District, Arizona.

EDITORS MINING PRESS:—On the eastern slope of the Chiricahua mountains, about 20 miles from the San Simon Station of the Southern Pacific railroad, is situated the above named district. It is crossed by three living streams of water, the banks of which are lined with heavy timber, suitable for smelting and lumbering purposes.

The Mineral Belt

Of the California mining district is about 6 miles wide and 17 miles long. The ores are copper and galena, smelting ores of high grade. Assays run from \$25 to \$1,600 per ton. A claim of high grade ore has been bought by a Pennsylvania company who are working the same with three shifts, and expect soon to have their smelter in full blast. The ores of this mine out of 20 assays gave \$400 as the highest, and over \$60 as the lowest, with an average of \$111 per ton smelting ore.

There are 10 men here now to where there was but one three weeks ago. Messrs. Kimbell & Son have an assay office; Messrs. Ryerson & Co. have a general merchandise store, at which point we expect soon to have a postoffice; Messrs. Bostich & Bro., a first-class blacksmith shop, and a weekly four-horse stage line to the San Simon R. R. Station every Saturday.

R. E. MACLEOD.

Oct. 24, 1880.

An Arizona Cave.

On Cave creek, in Yavapai county, a few miles above the ranch of an Apache chief named Modeski, there is a remarkable cave. A dense growth of dwarf cedar covers the ground in the vicinity and effectually conceals the opening of the cave. A trail so dim as to be scarcely noticeable, passes through this timber and leads to the opening which is about 24 ft. square. Crawling in a few ft. on your hands and knees, you suddenly find yourself in a chamber 50 ft. square and 30 ft. high. The cave is in a lime formation, and the water percolating for ages through the crevices in the rock, has covered the arched roof with stalactites clear as petrified icicles; drawn delicate traceries of fringe and curtain on the walls, and built up numerous stalagmites over the floor; one of which is as graceful and as beautifully proportioned as a Corinthian column. The most of these stalagmites are on one side of the room. There is one that attracts attention by its singular beauty and whiteness. One side of it is covered with scars, where it has been beaten by the Indian musicians while the beaux and belles threaded the mazes of some wild dance. Leading from this grand hall are numerous low passages which run in to other chambers. The cave has never been thoroughly explored so far as we know. It is known as Thorn's cave, and the legend is, that the man of that name, who a few years ago set the country wild with his stories of wagon loads of gold and silver, was imprisoned in it. Be this as it may, the cave, when fully explored, will prove to be one of the wonders of this wonderful land.—*Silver Bell.*

A SPECIAL permit having been granted to parties to work mines on the Fort Bowie military reservation causes much feeling among the old settlers there who have been refused the same privilege.

News in Brief.

THE Methodists have two orphan asylums in New Mexico.

LOUISIANA planters are contracting for Chinese coolies.

THE Manchester fire destroyed all the telegraph wires.

THE Pope, on Sunday, reaffirmed his right to the temporal power.

PERU and Chile have accepted the mediation of the United States.

SEVERAL squatters have been arrested in the Indian Territory.

GARIBALDI has declined Tennyson's invitation to visit him in England.

A COLORED man in Tennessee has given \$11,000 to build a church.

OVER 3,000 Chinese are employed near Lake Tahoe cutting wood and timber.

THE Ute Indians are running off horses, and a war is considered inevitable.

A GERMAN editor has received a severe sentence for libeling Bismarck.

THE Pope's new journal, the *Aurora*, 10 months old, has a circulation of 5,000.

THE Appletons will publish the memoirs of Jefferson Davis early in November.

ALL the coal oil in Quebec has been seized because it is under the government test.

THE Basutos have cut the land line of telegraph between Durban and Cape Colony.

TWO road agents were killed by Mexicans, northeast of Santa Fe a few days since.

THE authorities at Havana object to Chinese laborers leaving the island for Louisiana.

MR. DARWIN's works are to be issued in Russian by special arrangement with the author.

THE French Cabinet Council has decided to continue the enforcement of religious decrees.

At the Siletz Indian Agency, Oregon, there are over 150 members of the Methodist church.

THE whole number of the insane in Massachusetts is stated at 5,000, women preponderating.

It is said that among the ministers of the Church of Scotland there are many converted Jews.

THE *Beaver*, the first steamer that entered the Pacific ocean, was damaged by fire lately at Victoria, B. C.

A DEEPENING dislike and distrust of Gladstone is beginning to be displayed throughout Germany.

SEVERAL Pinte Indians near Winnemucca are making a success of farming. They raise grain and vegetables.

COUNT VON MOLTKE Oct. 26th refused the title of Prince offered to him on the occasion of his 80th birthday.

GEN. GARIBALDI and his son Menotti have withdrawn their resignations as members of the Italian Chamber of Deputies.

TWO wagon loads of venison arrived in Helena, M. T., on the 14th, and being the first of the season found a ready sale.

THE crew and the passengers of the *Mathilde Granville*, from St. Pierre for Granville, France, have been picked up at sea.

ELIAS SIMPKINS, Chief of the Pittsfield (Ill.) police, was shot and killed by Elliott Baker on Saturday night, Oct. 23d.

THE Goldendale (W. T.) *Sentinel* says a great deal of improvement is going on in that place and in Klickitat valley.

THE town of Kempen, near Crefeld, in the Rhineland, purposes celebrating the 500th anniversary of Thomas a Kempis.

THE body of a woman was found in the water at Chicago, Oct. 26th, with her infant child tightly clasped in her arms.

THE Puget Sound Salmon Packing Co. have closed operations for the season. They put up altogether about 3,000 cases.

M. LECOCQ, the composer of comic opera, is a diligent collector of old books, and has a special fondness for editions of Rabelais.

A MISSIONARY's wife wants the New Englanders to have old-fashioned apple-parings and send the missionaries some dried apple.

PHILADELPHIA has a sensation in the death, under suspicious circumstances, of the seventh wife of Michael Connor of that city.

CHILE and Colombia have agreed to submit their disputes to arbitration. The President of the United States is to act as umpire.

THE last Congregational minister deposed for doubts as to the eternal punishment of the wicked is Rev. Joseph Wassal, of Nora, Ill.

A FIRM in New York has been making a baby's outfit, for which is charged \$3,000, and has sent it home in two large wagons.

A DOG's head embroidered on the corner of a hankerchief is the thing to stick out of a gentleman's coat pocket for the moment.

THE cow boys threatened to stop the Presidential party at San Simon, N. M., but the train was run through the village and no trouble occurred.

THE Salt Lake *Tribune* figures that the average yearly hullion out-put in Utah for the past four years was a little more than \$6,000,000.

AT Woodland, Va., on Sunday night, Frank Allison shot his unfaithful wife and her paramour. He killed the man and fatally wounded the woman.

"BEWARE of Pickpockets," was one of the decorations on the wall before the eyes of members of the recent Pan-Presbyterian council in Philadelphia.

SECRETARY EVARTS is highly honored in church circles for his success in inducing the Turkish government to promptly avenge the murder of Dr. Parsons, the missionary.

By Universal Accord,
AYER'S CATHARTIC PILLS are the best of all purgatives for family use. They are the product of long, laborious and successful chemical investigation, and their extensive use, by physicians in their practice, and by all civilized nations, proves them the best and most effectual purgative Pill that medical science can devise. Being purely vegetable, no harm can arise from their use. In intrinsic value and curative powers no other Pills can be compared with them, and every person, knowing their virtues, will employ them, when needed. They keep the system in perfect order, and maintain in healthy action the whole machinery of life. Mild, searching and effectual, they are specially adapted to the needs of the digestive apparatus, derangements of which they prevent and cure, if timely taken. They are the best and safest physic to employ for children and weakened constitutions, where a mild but effectual cathartic is required.

FOR SALE BY ALL DEALERS.

Stopping the Paper.

If you don't like our paper, stop it. If we are not rendering you individually, or the community around you, or the special industry or calling you represent, an equivalent for your money, we don't want it. In fact, if for any reason you don't want to pay for the paper, you can stop it at any time by sending us word; not by telling the P. M., not by putting an unstamped letter in the office; not by sending back the paper (with or without your name) without your post-office address; but by sending us notice direct in a reliable manner. None need hesitate to subscribe for this paper for fear of not being able to stop it instant by the above directions. We know of publishers who have demanded the profession by persistently and obstinately neglecting to stop papers when ordered discontinued. Their acts are a hindrance, and we have been unjustly deprived of many good subscribers by the above named sin in publishers unworthy of their calling in more respects than one. We will offer a handsome premium on all subscribers who have difficulty in stopping their subscription when written notice is sent to this office.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), he sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove, walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Chew Jackson's Best Sweet Navy Tobacco

GENERAL MERCHANDISE.

WEDNESDAY M., Oct. 27, 1880.

CANDLES.		OILS.	
Drystal Wax.....	17 @ 31 1/2	Pacific Ghee Co's	60 @ 90
Eagle.....	12 @ 30	Nestfoot No.1.....	60 @ 90
Patent Sperm.....	25 @ 30	do, No. 2.....	95 @ 85
CANNED GOODS.		BAKED GOODS.	
Assorted Pie Fruits.....	25 @ 25	Baker's A. A.....	25 @ 30
2 lb cans.....	25 @ 25	Oliver, Plain.....	25 @ 30
Tahiti do.....	35 @ 30	do, Raisin.....	25 @ 30
Jams and Jellies.....	35 @ 30	do, Currant.....	25 @ 30
Pickles, 1 lb gal.....	25 @ 30	do, Apple.....	25 @ 30
Sardines, 1 lb box.....	67 @ 90	do, Currant.....	25 @ 30
Ht Boxes.....	25 @ 75	do, Currant.....	25 @ 30
Merry, Bull, do.....	25 @ 75	do, Currant.....	25 @ 30
Preserved Beef.....	35 @ 62 1/2	do, Currant.....	25 @ 30
2 lb doz.....	35 @ 62 1/2	do, Currant.....	25 @ 30
do Beef 4 lb doz.....	65 @ 30	do, Currant.....	25 @ 30
Preserved Mutton.....	25 @ 30	do, Currant.....	25 @ 30
2 lb doz.....	35 @ 30	do, Currant.....	25 @ 30
Beef Tongue.....	50 @ 65	do, Currant.....	25 @ 30
Preserved Ham.....	50 @ 65	do, Currant.....	25 @ 30
2 lb doz.....	50 @ 65	do, Currant.....	25 @ 30
Deviled Ham, 1 lb.....	50 @ 65	do, Currant.....	25 @ 30
do doz.....	50 @ 65	do, Currant.....	25 @ 30
do Ham, 1/2 doz.....	50 @ 65	do, Currant.....	25 @ 30
Boneless Pigs Feet.....	35 @ 30	do, Currant.....	25 @ 30
3 lbs.....	35 @ 30	do, Currant.....	25 @ 30
2 lbs.....	25 @ 75	do, Currant.....	25 @ 30
Spiced Fillets.....	35 @ 30	do, Currant.....	25 @ 30
2 lb doz.....	35 @ 30	do, Currant.....	25 @ 30
Head Obesees.....	50 @ 65	do, Currant.....	25 @ 30
3 lbs.....	35 @ 30	do, Currant.....	25 @ 30
COAL-DRESSING.		COAL-DRESSING.	
Australian, ton.....	50 @ 50	do, Currant.....	25 @ 30
Oco Bay.....	50 @ 50	do, Currant.....	25 @ 30
Bellingham Bay.....	50 @ 50	do, Currant.....	25 @ 30
Seattle.....	50 @ 50	do, Currant.....	25 @ 30
Cumbarland.....	50 @ 50	do, Currant.....	25 @ 30
Mt Diablo.....	50 @ 50	do, Currant.....	25 @ 30
Lehigh.....	50 @ 50	do, Currant.....	25 @ 30
Liverpool.....	50 @ 50	do, Currant.....	25 @ 30
West Hartley.....	50 @ 50	do, Currant.....	25 @ 30
Scotch.....	50 @ 50	do, Currant.....	25 @ 30
Seranton.....	50 @ 50	do, Currant.....	25 @ 30
Yanover id.....	50 @ 50	do, Currant.....	25 @ 30
Wellington.....	50 @ 50	do, Currant.....	25 @ 30
Charcoal, sack.....	75 @ 80	do, Currant.....	25 @ 30
Ooke, bush.....	60 @ 40	do, Currant.....	25 @ 30
COFFEE.		COFFEE.	
Sandwich Id.....	40 @ 40	do, Currant.....	25 @ 30
Costa Rica.....	15 @ 16	do, Currant.....	25 @ 30
Guatemala.....	15 @ 16	do, Currant.....	25 @ 30
Java.....	24 @ 25	do, Currant.....	25 @ 30
Madagascar.....	24 @ 25	do, Currant.....	25 @ 30
Ground, in c.....	25 @ 26	do, Currant.....	25 @ 30
FISH.		FISH.	
Sao to Dry Cod.....	44 @ 45	do, Currant.....	25 @ 30
do in cases.....	5 @ 55	do, Currant.....	25 @ 30
Eastern Cod.....	74 @ 75	do, Currant.....	25 @ 30
Salmon, lbs.....	30 @ 35	do, Currant.....	25 @ 30
Ht bbls.....	35 @ 40	do, Currant.....	25 @ 30
1 lb cans.....	1 @ 130	do, Currant.....	25 @ 30
Prld Cod, bbls.....	4 @ 45	do, Currant.....	25 @ 30
Ht bbls.....	4 @ 45	do, Currant.....	25 @ 30
Mackerel, No. 1.....	9 @ 10	do, Currant.....	25 @ 30
Ht Bbls.....	9 @ 10	do, Currant.....	25 @ 30
In Kits.....	1 @ 15	do, Currant.....	25 @ 30
Ex Mes.....	3 @ 40	do, Currant.....	25 @ 30
Prld Herring, by 300 @ 350	40 @ 42	do, Currant.....	25 @ 30
Boston Smkd Ht.....	6 @ 70	do, Currant.....	25 @ 30
LIME, ETC.		LIME, ETC.	
Plaster, Golden.....	3 @ 35	do, Currant.....	25 @ 30
Gate Mills.....	3 @ 30 @ 325	do, Currant.....	25 @ 30
Land Plaster, 10 @ 12 50	40 @ 42	do, Currant.....	25 @ 30
Lime, Sta Cruz.....	1 @ 125	do, Currant.....	25 @ 30
Obbl.....	1 @ 125	do, Currant.....	25 @ 30
Portland, Roen.....	2 @ 20	do, Currant.....	25 @ 30
Portland, 4 @ 450	40 @ 42	do, Currant.....	25 @ 30
TEA.		TEA.	
Young Hyson.....	35 @ 75	do, Currant.....	25 @ 30
Moynoe, etc.....	40 @ 65	do, Currant.....	25 @ 30
Country Pk'd Gun.....	30 @ 35	do, Currant.....	25 @ 30
Lima, Sta Cruz.....	30 @ 35	do, Currant.....	25 @ 30
Obbl.....	30 @ 35	do, Currant.....	25 @ 30
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Lima, Sta Cruz.....	30 @ 35	do, Currant.....	25 @ 30
Obbl.....	30 @ 35	do, Currant.....	25 @ 30
Portland, Roen.....	2 @ 20	do, Currant.....	25 @ 30
Portland, 4 @ 450	40 @ 42	do, Currant.....	25 @ 30
TEA.		TEA.	
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Portland, Ro			

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The best ever invented; can be applied to any Engine
Piston and give entire satisfaction to those using. Steam,
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Steam Engines and all Kinds of Mill and Mining Machinery.

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INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS,
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FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES,
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SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE
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Agents for the Allen Engine Governor, Bailey Air Compressor, Howell's
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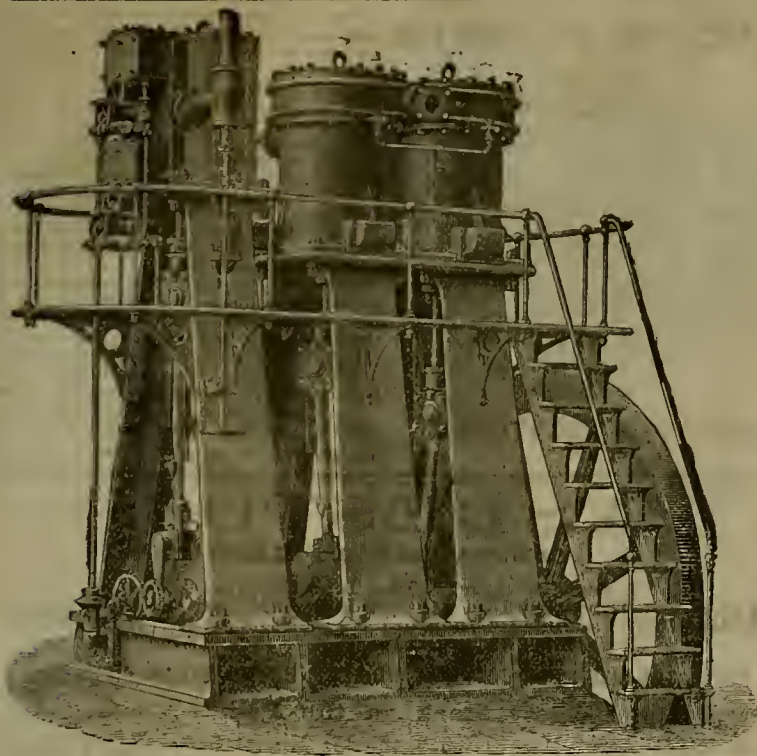
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With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts

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Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

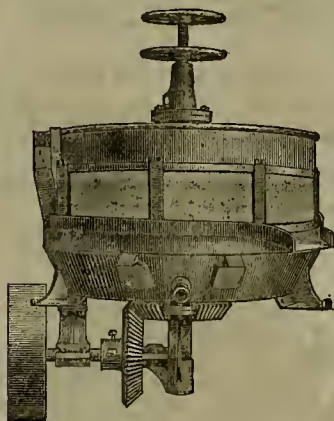
Small Sizes made in Sections not to Exceed 300 lbs.

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FRASER & CHALMERS
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REVOLVING CYLINDERS AND ORE DRYERS.
Hoisting and Pumping Machinery.

STEIGER & KERR'S CONTINUOUS DISCHARGE AND GRINDING PAN.



This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all; and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in millwork and mills can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

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HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding homastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 XX is the Strongest Explosive Known.

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Will Please take notice that we have taken the sole agency for the KNOWLES' STEAM PUMP, for the Pacific Coast States and Territories, and keep a full stock of Pumps and Duplicate Parts on hand at all times.

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LEA AND PERRINS' SAUCE,

Which are calculated to deceive the Public, Lea and Perrins have adopted A NEW LABEL, bearing their Signature thus,

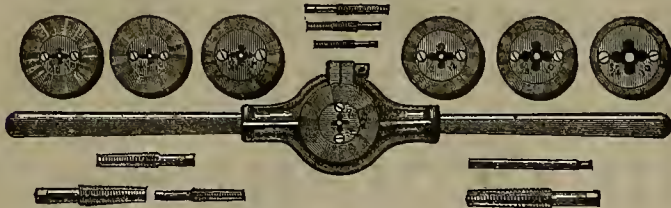
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Which is placed on every bottle of WORCESTERSHIRE SAUCE, and without which none is genuine.

Ask for LEA & PERRINS' Sauce, and See Name on Wrapper, Label, Bottle and Stopper. Wholesale and for Export by the Proprietors, Worcester; Crosse and Blackwell, London, &c., &c.; and by Grocers and Oilmen throughout the World.

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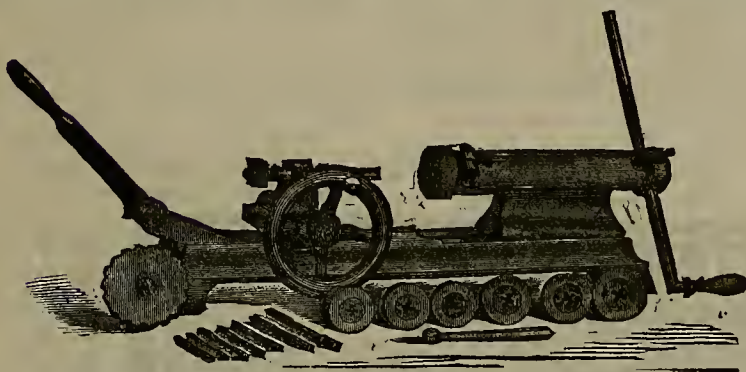
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WITH TAPS, DIES AND COLLETS COMPLETE.

B, Stock 23 inches long, 7 Taps and Dies Cuts $\frac{1}{4}$ to $\frac{3}{8}$ inch.
C, " 26 " " 7 " " " " $\frac{1}{2}$ to 1 "
D, " 53 " " 6 " " " " $\frac{3}{4}$ to $1\frac{1}{2}$ "

No. 0. Lightning Hand Bolt Cutters and Tappers.



ESPECIALLY FOR CROOKED WORK!

Made to be bolted to the Bench or Table. Fitted with seven sizes, from $\frac{1}{4}$ to $\frac{3}{8}$ inch. Usual assortment, $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ inch.

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VULCAN BLASTING POWDER.

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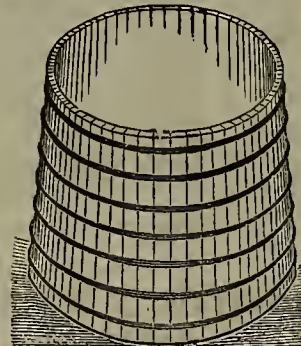
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SAN FRANCISCO, SATURDAY, NOVEMBER 6, 1880.

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Academy of Sciences.

At the meeting of the California Academy of Sciences held on Monday evening last, Mr. J. P. Moore presided. Dwight Whiting, Daniel Cook and Mrs. Ellen M. Colton were elected life members. The donations were by J. H. Sisson, "metate" found at Hawkinsville, Siskiyou county, nine ft. below the present surface. By W. F. Walmsley, of Beowawe, Nevada, one "fisher," dug up at a point in Nevada, 25 miles from Beowawe. By J. Barker, Sumner, Kern county, a lot of fossil eel teeth, found in sedimentary deposit at Rio Brava Ranch, and fossil shells found in indurated ocean silt, 300 ft. above the present bed of the Kern river, and a mortar with ball, found at the bottom of gravel deposit 10 ft. below the present surface. By Chas. H. Gilbert, H. W. Harkness and W. G. W. Huford, some excellent specimens of fish, including a stuffed sturgeon about seven ft. in length. By Miss S. Plummer, a fossil shell said to have been found on the bluff near the Cliff House. By J. H. Clark, Catho, Mendocino county, *sciuropterus volucella*, or flying squirrel.

Mr. B. B. Redding made some comments on the metate found at Hawkinsville near the Oregon line, nine ft. below the surface of the earth. It was a sort of table of stone resting on one long and two short legs, and was remarkable for being made of Mt. Shasta lava, evidently fashioned by former inhabitants of that region or by the present Indians or their ancestors. The metate is in use in Mexico, and it was supposed to have originated there; but evidently they had nothing to do with this one. He saw a smaller one at Yreka, which was found 23 ft. below the surface of the bar of the Klamath river. The fact that these evidently uncivilized people could take that hard stone and work it into shape with the rude instruments they had adapted to that purpose, was very remarkable. The metate was used for grinding grass seed, acorns and wild oats, which those people used for food. They were placed upon the table and the women crushed them with a roller, after which the meal fell into a dish or basket made of wild grass, formed with such skill that they were capable of holding water. Long lingao, another form of metate, was in use, made very much in the shape of a shell, and it looked like the back of a turtle. Mr. Redding next directed his attention to the Indian fisher, found by W. F. Walmsley, of Beowawe, Nevada, which was formed out of hornstone, a flinty substance, and which they used in dressing skins. J. W. McCoy, by letter, explained that he had found by experiment upon those susceptible to poison oak, that green or black tea boiled down to form a strong infusion, mixed with salt and applied to the part will prove effective in curing the affection. It worked where common salt seemed to be of no avail, and he suspected that its excellence was due to the tannin contained in the infusion. He believed that oak bark, or any substance containing a great quantity of tannin would be beneficial.

The Phylloxera.

The chairman read extracts of his own translation from the recent work of M. Maxime

Cornu on the phylloxera, describing the pestiferous insect from its inception to its maturity. Cornu devoted much time to the study of the phylloxera, making numerous investigations with the microscope and preparing some very elaborate plates of the insect in the different stages. He says that the phylloxera cannot be wet by any aqueous solution or water, for it has the power to inclose itself in a globe of air. Possibly water long continued might succeed in asphyxiating it. It also hides under the corky layer of the bark of the root of the vine, which is not readily attacked by moisture and succeeds in escaping from the effects of dangerous substances and washes. Pulling up the vines will not exterminate the pest, for some remain in the little rootlets, and come to the top of the ground again. In order to destroy them, it is necessary to have some treatment for the soil, capable of emitting some noxious vapor. This is the best way to attack the insect. The chairman explained that it seemed

Influence of Cages in Mine Ventilation.

A great deal depends upon the system of ventilation employed in mines. Not only will it influence the individual miners, but the whole mine and its profits as well. And especially is this the case in our very deep mines where the extensive underground workings extend in every direction laterally from the shafts for great distances. Not only is this subject one which affects the general health of mines, but their safety also. The system of upcast and downcast shafts, which is the simplest form of ventilation, is too well known to be more than referred to. In this a natural air current is induced.

The moving upward and downward in the shafts of the cages naturally influences the ventilation more or less, but not in the way one

A New Double Drum Mine Hoist.

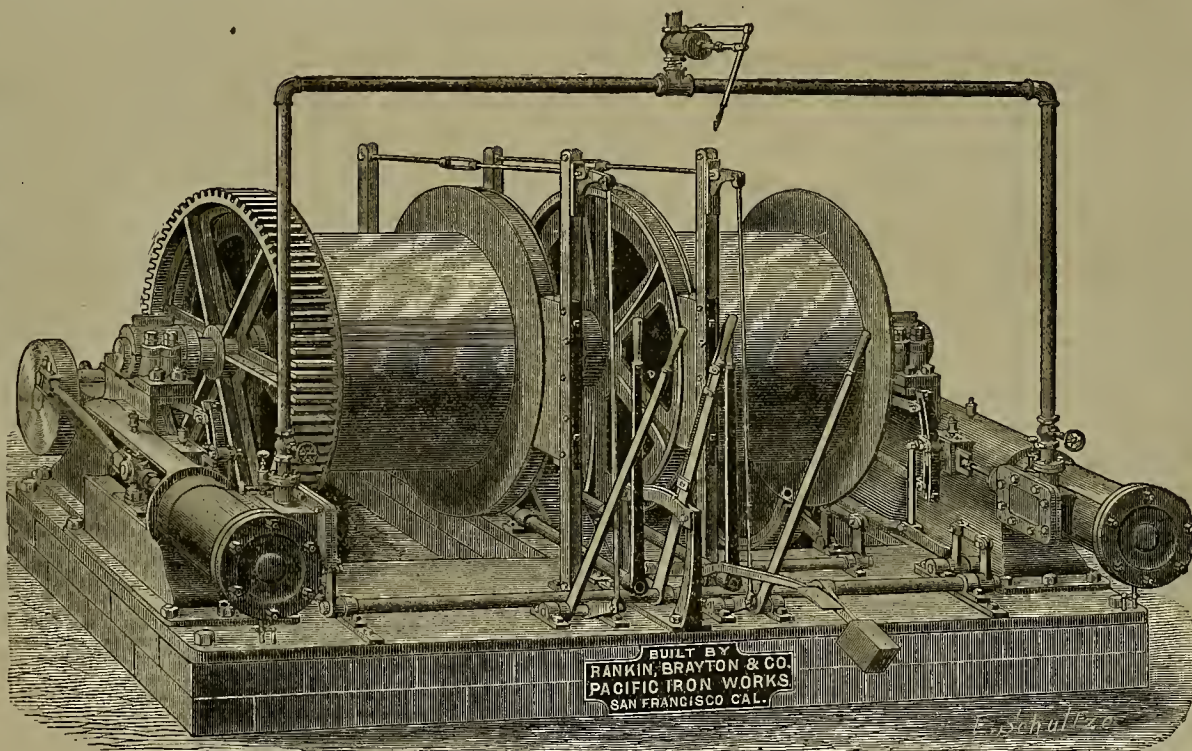
The accompanying cut represents an improved style of hoisting engine constructed at the Pacific Iron Works in this city. Quite a number of various sizes have recently been sent to prominent mines in different parts of the coast, and are said to give great satisfaction. A more compact, convenient and complete hoist, adapted to the requirements of practical work, has probably never before been devised. The following is a description of its construction and operation:

The hoist here shown is intended for mines having a double compartment shaft, and a pair of link motion engine attached to one crank shaft. The drums are loose on their shaft, and are brought into action by clutches sliding on steel feathers set into the shaft. The spur gear is keyed fast to the drum shaft, the bearing of which rest on solid cast brackets over each engine bed stand, and a cast bracket bolted to foundation in its center. By this arrangement the drums can be used together or separately, or one can be hoisting whilst the other is lowering into the shaft. A friction band brake is attached to the fly-wheel on crank shaft, and upright friction post brakes, with wooden shoes, act upon the brake rings of drums, the various levers for which, including the reversing gear and throttle valve, are all arranged so as to be under the control of the engineer at one point. They are made of various sized cylinders, from 10 inches to 16 inches in diameter.

RICH PLACER DISCOVERIES.—The Yuma Sentinel, of October 16th, says: During the past week considerable excitement has prevailed, caused by reports concerning the rich field of gold placers some eight miles from Mesquite station, about 40 miles west of here on the S. P. railroad. Yesterday

our news from there informs us that about 50 men are on the ground, nearly all of whom went from this town. Several men have been in during the week bringing with them from \$170 to \$800 in gold, which they have disposed of here. One dry washer is at work on the ground belonging to Hoagland and Powers, with which they are dry washing about six tons of dirt per day, averaging about \$16 to the ton. There is no doubt but that very extensive placer grounds exist there, although it may not all be as rich as the present location. Some very rich quartz ledges were located in the immediate vicinity of the placers nearly a year ago, and parties who own them are making preparations to work them immediately. From present appearances a large and thriving mining camp will spring up, which will add to the business prosperity of Yuma very materially.

The Superintendent of the Hite mine, at Hite's Cave, Mariposa county, was killed on the 29th ult. He was down in the mine, and being affected by foul air signaled to be drawn up, and just as he reached the surface and was about to step off, the cage rope parted and he fell to the bottom of the shaft, being horribly mangled. The shaft down which he fell is 700 ft. deep.



DOUBLE DRUM GEARED HOIST FOR ROUND WIRE ROPE.

that viticulturists had now overcome that difficulty by using bi-sulphide of carbon, or some kindred substance.

MEADOW LAKE.—The Truckee Republican learns from James Gould, that H. H. Hartley is still pushing ahead on his mine, the Excelsior, at Meadow Lake. Hartley is just as enthusiastic as ever, and firmly believes that section will ere long be the great mining center of the Sierras. He works his rock by hand, and has thereby made a living for himself for the last 10 years. Some of the rock in the Excelsior is said to go over a thousand dollars per ton. Hartley was the discoverer of the district, and he has remained there ever since. In winter he is generally alone, his only companions being the lonely pines and about 20 or 30 ft. of snow. If perseverance and faith go for anything, Mr. Hartley will some day become a bonanza prince.

The balance sheet of the New York Hill M. Co., Grass Valley, for the fiscal month ending October 15th, shows balance of cash on hand, after the payment of a \$10,000 dividend, of \$46,085.86. The billion receipts of the month were \$27,028.05 from amalgam, and \$2,888.70 from sulphurets, or a total of \$29,916.75.

could suppose. The influence of winding in both shafts on the amount of ventilation will be evident from the following results of a series of experiments carried out at Kirkless Hall colliery, England: The same engine winds from both shafts, so that whilst the cage is ascending in the one shaft it is descending in the other. When the winding engine is at rest the amount of ventilation was given as 62,000 cubic ft. per minute. When the cage is descending in the up-cast and ascending in the downcast shafts, the ventilation is given as 37,400 cubic ft. per minute. When the cage is ascending the up-cast and descending the downcast shafts, the ventilation amounted 67,400, or the mean during winding is 52,400 cubic ft., or 9,500 less during winding operations than when the cages are at rest. The shafts are 85 square ft. area, and the velocity of winding 15 ft. per second, or 900 ft. per minute, slightly greater than the velocity of the air current in the shaft.

BECAUSE of a rise in the price of water supplied to miners in Onion valley, El Dorado, the miners have allowed it to be shut off, but they are making money out of their claims without the aid of this water. One claim pays as high as \$1,000 per month and over with a rocker. There are some six or eight paying mines in the vicinity.

The Profusion of Life.

From the Introduction to "Life and her Children," in *Popular Science Monthly* for November:

I wonder whether it ever occurs to most people to consider how brimful our world is of life, and what a different place it would be if no living thing had ever been upon it? From the time we are born till we die, there is scarcely a waking moment of our lives in which our eyes do not rest either upon some living thing or upon things which have once been alive. Even in our rooms, the wood of our furniture and our doors could never have been if life did not exist; the paper on our walls, the carpet on our floors, the clothes on our back, the cloth upon the table, are all made of materials which life has produced for us; nay, the very marble of our mantel-piece is the work of once living animals, and is composed of their broken shells. The air we breathe is full of invisible germs of life; nor need we leave the town and go to the country in search of other living beings than man. There is scarcely a street or alley where, if it be neglected for a time, some blade of grass, or struggling weed does not make its appearance, pushing its way through chinks in the pavement or the mortar in the wall; no spot from which we cannot see some insect creeping, or flying, or spinning its web, so long as the hand of man does not destroy it.

And when we go into the quiet country, leaving man and his works behind, how actively we find life employed! Covering every inch of the ground with tiny plants, rearing tall trees in the forest, filling the stagnant pools full of eager, restless beings; anywhere, everywhere, life is at work. Look at the little water heetles skimming on the surface of the shady wayside pool, watch the water snails feeding on the muddy bank, notice the newts putting their heads above water to take breath, and then remember that besides these and innumerable other water animals visible to the naked eye, the fairy shrimp and the water flea, and other minute animals, are probably darting through the water, or floating lazily near its surface, while the very scum which is blown in ridges toward one corner of the pool is made up of microscopic animals and plants.

Then, as we pass over plain, and valley, and mountain, we find things creeping innumerable, both great and small, hidden in the moss or the thick grass, rolled up in the leaves, boring into the stems and trunks of trees, eating their way underground or into even the strongest rock. The lion, the tiger, and the elephant, roaming over Asia, Africa and India, rule a world of their own where man counts for very little. Even in our own thickly peopled country hares and rabbits multiply by thousands in their burrows, and come to frolic in the dusk of evening when all is still. The field-mice, land and water rats, squirrels, weasels and badgers have their houses above and below ground, while insects are to be found everywhere, testifying to the abundance of life. Not content, moreover, with filling the water and covering the land, this same silent power peoples the atmosphere, where tiny hats, hutterflies, bees, and winged insects of all forms and shapes and colors, fight their way through the ocean of air, while birds, large and small, sail among its invisible waves.

And by and by we reach the sea, and there we find masses of tangled seaweed, the plants of the salt water, while all along the shores myriads of living creatures are left by the receding tide. In the rocky pools we find active life busily at work. Thousands of tiny acorn shells, scarcely larger than the head of a good-sized pin, cover the rocks and fling out their thread-like arms in search of food. Small crabs scramble along, or swim across the pools, sand-sippers dart through the water, feeding on the delicate green seaweed, which in its turn is covered with minute shells not visible to the naked eye, and yet each containing a living being.

Anywhere, everywhere, creatures are to be found, and even if we sail away over the deep silent ocean and seek what is in its depths, there again we find abundance of life, from the large fish and other monsters which glide noiselessly along, lords of the ocean, down to the jelly masses floating on the surface, and the hanks of rocky coral built by drops of living slime in the midst of the dashing waves. There is no spot on the surface of the earth, in the depths of the ocean, or in the lower currents of the air, which is not filled with life whenever and wherever there is room. The one great law which all living beings obey is to "increase, multiply and replenish the earth;" there has been no halting in this work from the day when first into our planet from the bosom of the great Creator was breathed the breath of life, the invisible mother ever taking shape in her children.

No matter whether there is room for more living forms or not, still they are launched into the world. The little seed, which will be stifled by other plants before it can put forth its leaves, nevertheless thrusts its tiny root into the ground and tries to send a feeble shoot upward. Thousands and millions of insects are born into the world every moment which can never live, because there is not food enough for all. If there were only one single plant in the whole world to-day and it produced 50 seeds in a year, and could multiply unchecked, its descendants would cover the whole globe in nine years.* But, since other plants prevent it from spreading, thousands and thousands of its seeds and young plants must be formed only to perish. In the same way one pair of birds having four young

ones each year, would, if all their children and descendants lived and multiplied, produce *two thousand million* in 15 years,† but, since there is not room for them, all but a very few must die.

What can be the use of this terrible overcrowding in our little world? Why does this irresistible living breath go on so madly, urging one little being after another into existence? Would it not be better if only enough were born to have plenty of room and to live comfortably?

Wait a while before you decide, and think what every creature needs to keep it alive. Plants, it is true, can live on water and air, but animals cannot; and, if there were not myriads of plants to spare in the world, there would not be enough for food. Then consider again how many animals live upon each other. If worms, snails and insects were not over-abundant, how would the birds live? Upon what would lions and tigers and wolves feed if other animals were not plentiful, while, on the other hand, if a great number of larger animals did not die and decay, what would the flesh-feeding snails and maggots and other insects find to eat? And so we see that for this reason alone there is some excuse for the over-abundance of creatures which life thrusts into the world.

But there is something deeper than this to consider. If in a large school every boy had a prize at the end of the half year, whether he had worked or not, do you think all the boys would work as hard as they do or learn as well? If every man had all he required and could live comfortably, and bring up his children to enjoy life without working for it, do you think people would take such trouble to learn trades and professions, and to improve themselves so as to be more able than others? Would they work hard day and night to make new inventions, or discover new lands, and found fresh colonies, or be in any way so useful or learn so much as they do now?

No, it is the struggle for life and the necessity for work which make people invent and plan, and improve themselves and things around them. And so it is also with plants and animals: life has to educate all her children, and she does it by giving the prize of success, of health, and strength, and enjoyment to those who can best fight the battle of existence, and do their work best in the world.

Every plant and every animal which is born upon the earth has to get its own food and earn its own livelihood, and to protect itself from the attacks of others. Would the spider toil so industriously to spin her web if food came to her without any exertion on her part? Would the caddis-worm have learned to build a tube of sand and shells to protect its soft body, or the oyster to take lime from the sea water to form a strong shell for its home, if they had no enemies to struggle against and needed no protection? Would the bird have learned to build her nest or the beaver his house if there were no need for their industry?

But as it is, since the whole world is teeming with life, and countless numbers of seeds and eggs and young beginnings of creatures are only waiting for the chance to fill any vacant nook or corner, every living thing must learn to do its best and to find the place where it is most useful, and least likely to be destroyed by others. And so it comes to pass that the whole planet is used to the best advantage, and life teaches her children to get all the good out of it that they can.

If the ocean and the rivers be full, then some must learn to live on the land, and so we have, for example, water snails and land snails, and whereas one kind can only breathe by gills in the water, the other breathes by means of lungs in the air, while between these are some, such as the river snails of the tropics, which have both gills and lungs, and can breathe in both water and air. We have large whales sailing as monarchs of the oceans, and walruses and seals fishing in its depths for their food, while all other animals of their kind live on the land.

Then, again, while many creatures love the bright light, others take advantage of the dark corners where room is left for them to live. You cannot lift a stone by the seaside hut what you will find some living thing under it, nor turn up a spadeful of earth without disturbing some little creature which is content to find its home and its food in the dark ground. Nay, many animals for whom there is no chance of life on the earth, in the water, or in the air, find a refuge in the bodies of other animals and feed on them.

But in order that all these creatures may live, each in its different way, they must have their own particular tools to work with, and weapons with which to defend themselves. Now, all the tools and weapons of an animal grow upon its body. It works and fights with its teeth, its claws, its tail, its sting, or its feelers; or it constructs cunning traps by means of material which it sucks out of the water, as in the case of the oyster, or gives out from its own body, like the spider. It hides from its enemies by having a shape or color like the rocks or the leaves, the grass or the water, in which it lives. It provides for its young ones either by getting food for them, or by putting them, even before they come out of the egg, into places where their food is ready for them as soon as they are born.

So that the whole life of an animal depends upon the way in which its body is made; and it will lead quite a different existence according to the different tools with which life provides it, and the instincts which a long education has been teaching to its ancestors for ages past. It will have its own peculiar struggles and difficulties, and its own peculiar triumphs according

to the kind of bodily powers which it possesses, and the study of these helps us to understand its manner of existence.

And now, since we live in the world with all these numerous companions, which lead, many of them, such curious lives, trying, like ourselves, to make the best of their short time here, is it not worth while to learn something about them? May we not gain some useful hints by watching their contrivances, sympathizing with their difficulties and studying their history? And, above all, shall we not have something more to love and to care for when we have made acquaintance with some of life's other children besides ourselves?

What we most want to learn is something of the *lives* of the different classes of animals, so that when we see some creature running away from us in the woods or swimming in a pond, or darting through the air, or creeping on the ground, we may have an idea what its object is in life—how it is enjoying itself, what food it is seeking, or from what enemy it is flying.

And, fortunately for us, there are an order and arrangement in this immense multitude, and in the same way as we can read and understand the history of different nations which form the great human family spread over the earth, and enter into their feelings and their struggles, though we cannot know all the people themselves; so, with a little trouble, we may learn to picture to ourselves the general life and habits of the different branches of the still greater family of life, so as to be ready, by and by, to make personal acquaintance with any particular creature if he comes in our way.

A Railway in the Rocky Mountains.

A correspondent of the *Donver Times*, describing the extension of the Denver and Rio Grande railway from Conejos westward toward the San Juan country, gives these picturesque hits. He says: For miles the railway curved among the hills, keeping sight of the plains and catching frequent glimpses of the village. Its innumerable windings along the brows of the hills seemed, in mere wantonness, as loth to abandon so beautiful a region. Almost imperceptibly the foothills changed into mountains and the valleys deepened into canyons, and winding around the point of one of the mountains it found itself overlooking the picturesque valley or canyon of Los Pinos creek. Eastward was the rounded summit of the great mountain of San Antonio; over the nearest height could be seen the top of Sierra Blanca, canopied with perpetual clouds; in front were castellated crags, art-like monuments and stupendous precipices. Having allured the railway into their awful fastnesses, the mountains seemed determined to haffle its further progress. But it was a strong hearted railway, and, although a little giddy 1,000 ft. above the stream, it cuts its way through the crags and among the monuments and hears onward for miles up the valley. A projecting point, too high for a cut and too abrupt for a curve, was overcome by a tunnel. The track layers are now busy at work laying down the steel rail at a point a few miles beyond this tunnel. The grade is nearly completed for many miles further. From the present end of the track for the next four or five miles along the grade, the scenery is unsurpassed by any railroad scenery in North America. Engineers who have traversed every mile of mountain railroad in the Union, assert that it is the finest they have seen. Perched on the dizzy mountain side, at an altitude of 9,500 ft. above the sea—greater than that of Vets pass—1,000 ft. above the valley, with hattermented crags rising 500 or 600 ft. above, the beholder is enraptured with the view. At one point the canyon narrows into an awful gorge, apparently but a few yards wide and nearly 1,000 ft. in depth, between almost perpendicular walls of granite. Here, a high point of granite has to be tunneled, and in this tunnel the rock men are at work drilling and blasting to complete the passage, which is now open to pedestrians. The frequent explosions of the blasts echo and re-echo among the mountains until they die away in the distance. Looking down the valley from the tunnel, the scene is one never to be forgotten. The lofty precipices, the distant heights, the fantastic monuments, the contrast of the rugged crags and the graceful curves of the silvery stream beneath them, the dark green pines interspersed with poplar groves, bright yellow in their autumn foliage, that crown the neighboring summits—height, depth, distance and color—combine to constitute a landscape that is destined to be painted by thousands of artists, reproduced again and again by photographers, and to adorn the walls of innumerable parlors and galleries of art. Beyond the tunnel for a mile or more the scene is even more picturesque, though of less extent. The traveler looks down into the gorge and sees the stream plunging in a succession of snow-white cascades through narrow cuts between the perpendicular rocks.

THE 3,000 LEVEL.—The first ore bodies discovered on the Comstock, says the *Carson Appeal*, were small but frequent; then came a barren belt until the Big Bonanza was found in Con. Virginia and California. Now they are sinking through another barren belt, and below this the indications are that there is ore, and when found it will prove something wonderful. Mackey never believed that the 2,600 of Union would show anything, neither did Patton. They are making for the 3,000 level and following the stringers down

An Asiatic Mint.

The mint at Cahul, Afghanistan, does a large business in recoining English into Afghan rupees. The business is very profitable, as appears from the fact that although the Afghan rupee contains 2½ less alloy than the English, the relative values are as 12 to 15. In addition to the recoinage of rupees, Chinese silver, personal ornaments and the silver coinage of other countries are also converted into coin. A correspondent of the *London Times* gives the following description of the mint and the processes carried on therein:

"In one of the rude sheds running around the court-yard, are two rows of small, round clay hearths, elevated an inch or two above the floor, and depressed, like a plate, in the middle. A pile of rupees—generally 300—having been counted and weighed, is placed upon one of these hearths in a carefully prepared bed of hone ashes, and covered over with charcoal and wood. The charcoal is then lighted, and, when well aglow, four lbs. of lead for every 300 rupees are added to the furnace. The lead, in combination with the hone ashes, separates, as is well known, the alloy. This first process converts the rupees into a dull, unsightly mass of silver, free, or nearly so, from alloy. The pure silver thus extracted is then carried to another shed, carefully weighed, and an amount of English rupees equal to its weight added to it. Rupees and silver are then melted together in a clay crucible, and the melted mixture is ladled by hand into molds, which give it the shape of flattened bars about 12 inches long. These bars are then taken to a third shed, to be annealed by hammering and given the form of slender round rods. The next process is that of drawing these rods through a plate of iron perforated with round holes to give them a uniform circumference. This is done by means of a rude hand-wheel; after which, the rods are cut by a hammer and chisel into the lengths requisite to form the future rupees, each of which lengths is carefully weighed in a pair of scales. Any that are too heavy are handed to a workman, whose business it is to slice off a fragment with his chisel; and that, on the contrary, are too light, are handed to another workman, who notches the little cylinder by a blow on his chisel, and inserts the required fragment in the notch. The cylinders are next carried to a fifth shed, and after gently heating, are hammered into small round disks, which have a yellowish-white color. To remove this color and give them brightness, they are next plunged into a caldron of boiling water, in which they are hoiled for some time, along with apricot fruit and salt. This process imparts brightness to the dull disks of silver, and they are then ready for the last process they have to go through, that of stamping. This is perhaps the most interesting part of the operation. Two operators sit facing one another, half naked, on the ground, with a little iron anvil between them. In the face of the anvil is inserted a steel stamp, destined to give the impression which the under side of the rupee will bear. One operator places the little silver disks with great quickness and accuracy upon the stamps; and the other, who is armed with a heavy hammer in right hand, and a steel stamp, hearing the inscription destined for the upper side of the rupee, in his left, with one heavy, well-delivered blow, impresses the device on the soft lump of silver. Lastly, each rupee thus stamped is again weighed, and deficiencies in weight made up by the same rude process as noted at another stage of the work, the amended rupee passing once more under the hands of the stampers."

A GREAT QUARTZ MILL.—The Butte (Montana) *Miner*, of October 21st, gives the following account of the splendid new mill of the Alice mine: The progress made during the past two weeks towards the completion of the new mill is very satisfactory. The three batteries of boilers, with their attachments, have been successfully put up. The 450-horse power engine, the largest in the Territory, is in position, and lacks only the fly-wheel, not yet arrived, to be complete. Twelve of the 18 pans and 6 of the nine settlers are ready to begin work. The mortars for 60 stamps and battery timbers for the same are in place, and the stamps are in the mill ready for adjustment. The re-torts and a portion of the winter's salt supply have also been received. On the ore floor 400 tons of ore have been dumped, to be in readiness for the stamps when the fires are started. The Statefeldt auxiliary furnaces on the west side of the mill will be finished this week, and those on the east side are being forwarded as fast as possible. Outside the mill is a reserve of upwards of 4,000 tons of ore, to be used in case of accident to the machinery at the mine. The inside of the building is already beginning to look like a quartz mill. It will be complete in all its appointments, and will be the largest structure of the kind in the world. It is a veritable forest of timber.

It is a curious fact that every prince of the royal house of Prussia, when young, is taught some useful trade or other, for the purpose of sobering the mind and bringing it face to face with the material world and the realities of life, and among the profusion of curiosities and artistic relics which crowd the Emperor's private cabinet may be seen specimens of bookbinding, carving, carpentering, and other handiwork performed by his sons and grandsons.

A 40-STAMP mill was recently shipped from this city to the Mina Prieta of Sonora.

*Huxley.

MECHANICAL PROGRESS.

The "Anthracite."

The little steam yacht *Anthracite*, which has lately visited this continent from England, being the smallest steamer that has ever performed the voyage under steam, crossed the Atlantic in 18 days, on a consumption of 19 tons of coal. This event naturally created a great deal of interest with the public generally, as well as with scientific engineers. While she was in this country, she was examined and inspected by many of our leading engineers and ship owners, etc., who took advantage of the various opportunities given them of observing the working of the machinery during many short trips made for their convenience while the yacht was lying off New York, Philadelphia, Providence, Newport and Stonington.

Just previous to her departure, at the request of the United States Naval authorities, she was, for about a fortnight, in the hands of the engineers of the Navy yard at Brooklyn, where a board of officers, under Chief Engineer C. H. Loring, U. S. N., and appointed by Mr. Shock, Chief of the Engineering Bureau at Washington, opened up and examined her machinery, and were very much pleased with the appearance of the cylinders and rings after the Atlantic voyage. They also carried out a series of tests and experiments as to the capabilities of the boiler and engines, the consumption of water and coal, etc., taking during the trials about 300 diagrams and other data. To work up all these data and prepare a report will of course take time, and the report has not yet been made.

Her safe and successful return to England has already been reported. Immediately after her return, her machinery was carefully examined by a competent board of engineers, who reported that her engines and boiler were not one whit the worse for her run of 10,000 miles with steam at pressures varying from 300 to 400 lbs. per square inch all the time. No repairs of any kind have been made to either engines or boiler since she left England in May last, beyond the making good a circulating pump valve which got adrift after leaving Falmouth for London on her way back.

It will be remembered that the *Anthracite* is engined on the Perkins' high-pressure principle, and was commissioned for the special purpose of testing the practicability and economy of applying high-pressure engines to ocean navigation. The boilers used are of tubular construction, and are considered safe at 800-lb. pressure. Heretofore the boilers of sea-going steamers have been considered unsafe at even 70 lbs. The question of economy in generating and applying steam in ocean steamers, is one of vast interest to the entire community, and the parties who fitted out the *Anthracite* are deserving of much credit for this interest they have taken in the matter. The trial has been one of the most important and interesting ever undertaken in any country since the general inauguration of ocean steam navigation; and as the matter now stands, it looks very much as though the experiment might be the initiatory steps toward inaugurating a new era in marine engineering.

There is claimed for this system: 1st, small consumption of fuel; 2d, safety from explosion; 3d, durability of boilers; 4th, disuse of lubricants; 5th, reduction in weight and space—any one of which is an important consideration to steam users.

It may not be out of place to state here that there is an engine already in use, and being built by the Herreshoff Manufacturing Company, of Bristol, R. I., which, if we understand its construction, is designed to accomplish the same end as that proposed by the proprietors of the Perkins engine. These engines, however, are of the compound type, and the company named have issued a challenge to the English company for a competitive test, in similarly built boats, in relation as to the speed and economy of the two engines.

Hardened Steel.

The well-known fact that steel is of less specific gravity after hardening has given rise to varied explanations as to the cause, but it seems no unnatural result when viewed in connection with the general experience with other metals under heat treatment. It is indeed a matter of some surprise that so much doubt and difference of opinion should exist.

In tempering or hardening, the steel is heated to the required temperature, and then dipped into the hardening fluid, and thus undergoes a rapid cooling process.

The effect of the rapid cooling is to hastily set the outer surface of the steel with a slight contraction around the hotter and still expanded metal within, leaving the volume of the steel a trifle greater than if all the molecules had been cooled simultaneously, and allowed their own share in contraction, which would have the effect of a gradual cooling of the steel, when the metal would have returned to its original constitution prior to heating.

It is for the same reason that a steel bar, being heated and one face only dipped into the cooling or hardening fluid, will be longer on the tempered or cooled face than on the untempered face, demonstrated in the bending the bar, the hardened portion being the outer or longer surface of the bend. The tempered

face is cooled suddenly, and "set" while the bar is still of nearly a length due to the expansion of heat, and the rest of the bar cooling gradually has a tendency to shrink or contract normally, but is affected by the set condition of the tempered portion.

The bar, if of wrought iron, would not show as great a bend as if of steel, owing to the fact of wrought iron being a somewhat better conductor of heat, and to the greater freedom of action in the molecules of wrought iron than those of steel.

The result of a similar treatment of copper (gold or silver) would be much less marked than in either steel or wrought iron, with correspondingly less variation in specific gravity, the heat conducting powers and freedom of molecular action of the former metals being much greater than of iron and steel. Glass or porcelain being very poor conductors of heat, and the molecules having little freedom of action, snap asunder under the same treatment.

To recapitulate: The specific gravity, under the circumstances mentioned above, would vary inversely as the power of heat conduction and freedom of molecular action of the various metals or substances experimented upon.—*American Engineer.*

Economic Production of Steam.

The *American Manufacturer* states that for 35 years persistent efforts have been made to run steam generators inside the fire-box or furnace of steam boilers. All, however, proved signal failures until Mr. Good hit upon the true principle of keeping up a steady and continuous supply of water from the boiler into the generator. No matter how intense the heat to which the latter is subjected, the water cannot be driven from it into the boiler, which is rapidly generated and forced into the boiler. In the days of prosperous manufacturing, few men paid much attention to their fuel bills, but the close margins to which all are now subjected through competition, makes the consumption of fuel a matter of serious consideration. It has been practically demonstrated that this appliance—placed in the furnace and connected with the boiler—will save from 30% to 40% in fuel. The time consumed every day in getting up steam will also be reduced about one-half. And what is equally important with the saving of fuel is that the working capacity of the boiler will be increased nearly one-half in power by the additional area of heating surface exposed to the flames in a position where the heat will be most effective, and by the rapidity with which the steam is generated. Hundreds of boilers, now unable to do the work required of them, may be retained by their owners if this device is used. There can be no question as to durability, for experience has shown that the circulation of water being maintained through the pipes they will not burn out any more readily than the flues of a boiler. It can be as easily attached to marine or locomotive as to tubular boilers. The low cost for which this apparatus can be furnished will, it is claimed, make its use universal, as it soon pays for itself.

EARLY IRON MAKING IN ENGLAND.—In the reign of Edward III. iron was so scarce that the pots, spits and frying pans of the royal kitchen were classed among the king's jewels. Up to the end of the 15th century, English iron was not only dearer but inferior to that manufactured on the continent. During the 15th century the manufacture of iron began to be extensive in Sussex, where the ore and timber for smelting it abounded, and iron mills soon became numerous in the country. The landed proprietors entered into the business eagerly, and not only were many ancient houses enriched thereby, but several new men acquired wealth and founded families. In the forest of Dean also iron was largely smelted, but the land soon became denuded of trees in consequence of the exclusive use of charcoal for smelting; people became alarmed, and many edicts were promulgated restricting the manufacture of iron. Eventually the feeling became so strong, that from the time of the Restoration the iron manufacture of England rapidly declined. Coal, as then used, injuriously affected the quality of the iron, and it was not till the beginning of the 18th century that steps were taken to overcome this difficulty.

NEW TREATMENT FOR ZINC.—It is now found practicable to relieve zinc plates or sheets of their rigidity, and thus facilitate the working of the same into the various forms desired. In the treatment of sheet zinc, with this in view, a bath of linseed oil is prepared, and into this the plates are plunged, these being subjected to the action of oil while in a state of ebullition for some 30 minutes, more or less, according to the thickness of the metal; the plates are then removed from the bath, and after the oil is thoroughly drained from their surfaces, they are well cleaned, and are then ready for the market. Plates which have passed through this process are represented to possess great ductility, and to be capable of receiving and retaining a high polish; on this account they may be advantageously employed as a substitute for lead or pewter, at a great reduction in cost in a variety of cases—among these, for example, being the linings of sinks and cisterns, and the covering of counter and other surfaces requiring a metallic protection.

SCIENTIFIC PROGRESS.

Practical Value of Science.

Our obligations to the branch of physics are almost unlimited, but we will mention only two or three applications of a single agent in this wide field. It would seem to roll back the world into the dark ages to take from it now the benefits of electricity in its multiplied and yet rapidly multiplying applications.

It seems incredible, from our present standpoint, that so short time ago, in our congressional halls, the electric telegraph was almost ridiculed and voted into oblivion, from which it could never rise. When a bill was presented, appropriating \$30,000 to be expended, under the direction of the Postmaster-General, in a series of experiments to test the merits of Morse's electro-magnetic telegraph, one member moved an amendment requiring half the appropriation to be used for the encouragement of mesmerism. Another proposed to include Millerism in the benefits of the appropriation; others to appropriate part of the sum to a telegraph to the moon. And when the bill came to a final vote, this was so close that a change of three votes would doubtless have left us till this day without the benefits of the telegraph. After his invention was in working order, and transmitting messages between Baltimore and Washington, Mr. Morse offered it to Congress, to be attached to the Postoffice Department, for the sum of \$100,000. But it was declined, on the statement of the Postmaster-General, who reported that, while the invention was "an agent vastly superior to any other ever devised by the genius of man," he was not satisfied that "under any rate of postage that could be adopted its revenue could be made to equal its expenditures." By this short-sighted want of appreciation of science, the United States Government deprived itself of a source of revenue sufficient, doubtless, to liquidate the entire national debt in a single decade.

The application of electricity, now attracting world-wide attention, enjoys a vastly more hearty reception than did the telegraph. The telephone is constructed on the principle of the human ear. It consists of an elastic diaphragm to receive vibrations of air from the human voice or from other sources, so connected with the wires of a battery (or even with wires without a battery) as to communicate the same vibrations in every respect to another membrane or diaphragm situated at a distance. The two diaphragms of a telephone in distant places correspond, in every practical sense, to the two membranes of the human ear, and the connecting wire to the chain of bones between the two membranes. Probably no invention has come more rapidly into popular favor. Already many thousands of them are in practical use in this country and abroad.

The speaking phonograph is also copied from the human ear. The vibrating diaphragm, in this case, has a stylus connected with it, which impresses the peculiarities of vibration, due to any particular sound, upon a roll of tin foil arranged to receive the impression. By reversing the process, the indentations and prominences of the tin foil cause the stylus to fall and rise, which results in vibrations of the membrane, and these reproduce the original sound. These impressed sheets of tin foil may be preserved or mailed to any part of the world, and by putting them into a similar instrument, may be made to reproduce the pitch, tone and quality of the original sound thousands of miles, or of years distant. By this instrument, voice may be photographed, as the face is photographed, and we may listen to the veritable voice of the dead, or preserve for future comparison the voice of a person from the first infant prattle and the manly utterances of mature life even to the feeble speech of old age. Public speeches and songs may thus be preserved and delivered indefinitely or till the tin foil wears out. In public libraries may be preserved languages of different nationalities spoken from century to century "with all the peculiarities of pronunciation, dialect and brogue."—*Prof. Trowbridge in The Advance.*

Change of Climate in the Sierras—The Cause.

Prof. Legate has just returned from a trip into the Sierras of eight days' duration. He had with him two assistants and his own vehicle for the transportation of his instruments, and camped out most of the time. The object of the professor's trip was the study of recent interesting meteorological changes in the elevated regions of the Sierras. He was led to believe that during the present season the warm belt had shifted south. Beginning at a point just north of Lake Tahoe, the snow has not melted away as in former years. There are now banks of snow from 50 to 100 ft. in depth at points where heretofore at this season no snow has lain. Nearly the whole of this snow will remain where it now lies until the snows of winter again set in. Up toward the head waters of the North Fork of the Yuba river, where no snow is usually seen at this season, it has but little more than begun to disappear. In that place are to be seen huge banks of snow, under which flow the waters of the stream, forming arches or natural bridges 100 ft. in height, and from 200 to 300 ft. in width.

It was for the purpose of ascertaining the cause of this remarkable change of climate that Prof. Legate went on his expedition into the mountains. Through the results obtained by observations made at many points with various delicate instruments, but principally by means of careful thermometrical tests, this professor has established the fact that there has occurred in the range of the Sierra Nevada mountains this season a grand isothermal change. He finds that the warm current of air which ever since the settlement of California by Americans—and probably ages before—has moved upward from the Pacific seaboard to the Sierra Nevada mountains and thence turned and flowed to the northward along the west side of the main ridge of the range, thus giving to all regions in that direction a warm climate, no longer moves in that direction. It now comes up from the side of the ocean and pours eastward directly across the crest of the Sierras near Lake Tahoe.

Prof. Legate has satisfied himself that this wonderful change, which is leaving all the northern parts of the Sierras buried in snow, summer and winter, is caused by the denudation of timber which the mountains have suffered through a belt beginning at Lake Tahoe and extending some 20 miles southward. Through the great gap thus left by the sweeping away of the forests now flows the warm current of air which formerly moved—with something of the circling motion of water in an eddy—far along the mountains to the northward. Prof. Legate says it must not be supposed that the change has been caused merely on account of the gap or trough left by the clearing away of the forests. The denudation of the ground is the principal cause. The heat of the sun pouring down upon the broad belt of bare ground now reaching across the mountains causes at that point an immense ascending column of heated air which draws in from the west the current which formerly moved to the northward and now all crosses the Sierras, passing in an upward and eastward direction.

The professor is of the opinion that the only thing capable of changing the isothermal line which has been recently accidentally and disastrously established is the creation, at some point well north, of another broad belt of denudation, the influence of which will be to draw in that direction a portion of the warm current of air moving up to and along the western slope of the Sierras, and thus partly restore the equable temperature that formerly prevailed. He thinks the railroad which is to run in the direction of Oregon from Reno, and which is to strike and tap the great pine forests of the Sierras well to the north, will after a few years effect the desired change.—*Virginia City (Nev.) Enterprise.*

PHOSPHORUS IN IRON.—Of all the hindrances in the way of producing good iron, phosphorus is the most vicious ingredient to be removed, and the quantity present in most ores is much more than is generally supposed. Mr. Bell, in a recent statement, said that fully 30,000 tons of phosphorus were contained in the ores annually taken from the mines of Cleveland, in the north of England. The process of separation has not yet been fully mastered, notwithstanding great progress has been made in that direction during the last 10 years. Many minds are now engaged in this research. "It may be difficult," as remarked by Mr. Bell, "but let it not be supposed that there would be any surprise excited in the minds of chemists if a simple and inexpensive process for separating iron and phosphorus were made known tomorrow; so that only one of the latter should be found in 5,000 of the former."

ELECTRIC LIGHT IMPROVEMENT.—One of the great drawbacks to the economical use of the electric light is the waste of light attending the use of ground glass, no proper substitute for which has been suggested until now. A Frenchman, M. Clemandot, has been trying recently to use fine spun glass or "glass wool" for diffusing the light of the electric arc, his object being to decrease the waste usually attending the employment of ground glass. He builds up his globe, which is conical in shape, with a number of tubes placed side by side and well closed at the top and bottom to exclude the dust. These tubes are filled with glass spun by a peculiar process, so as to yield fibers very much finer than the finest cocoon silk. It is stated that he succeeded in reducing the absorption of light from 30% with ordinary globes to 15% by the use of his improved apparatus.

A PHENOMENON OF ELASTICITY.—If elastic gum is warmed, then expanded and wound in a spiral upon a glass tube or wire and cooled for a short time in a cooling mixture, it shows no tendency to contract, but when it is submitted to hot water it returns quickly to its original length. This phenomenon can also be noticed without the use of the cooling mixture. If one holds heated gum a second in an expanded condition it shows no disposition to return to its original length; but if one immerses it in hot water it contracts to one-fourth or one-fifth and remains contracted to the third or fourth of its original length. Maxwell found similar phenomena in gutta-percha, when this was subjected to expanding influences when in a cool condition. These are very marked phenomena of the secondary effects of elasticity.

PINES and other needle-leaved trees, and especially those containing resinous matter, absorb and exhale more water than other species.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Oct. 14.	Week Ending Oct. 21.	Week Ending Oct. 28.	Week Ending Nov. 4.
Alpha.....	4.80	4.40	4.40	4.20
Alta.....	3.20	2.70	2.60	3.40
Andes.....	1.10	1.30	1.35	90
Argenta.....	30c	25c	20c	60c
Atlantic.....	.....	.....	.....	.....
Aurora Tunnel.....	.....	.....	.....	.....
Baltimore Con.....	4.20	4.15	4.15	4.10
Belcher.....	4.20	4.15	4.15	4.10
Belmont.....	4.20	4.15	4.15	4.10
Best & Belcher.....	10.10	8.10	9.10	8.10
Bullion.....	2.10	1.30	1.95	2.10
Bechtel.....	1.65	1.35	1.60	1.30
Belle Isle.....	2.10	4.20	2.15	3.10
Bodie.....	4.10	3.10	3.60	3.40
Benton.....	1.10	1.10	1.20	1.30
Boyle.....	.....	.....	.....	.....
Black Hawk.....	10c	10c	10c	10c
Belvidere.....	15c	5c	45c	45c
Booker.....	20c	15c	10c	15c
Caledonia.....	30c	20c	40c	45c
California.....	2.10	4.20	2.15	3.10
Challenge.....	1.90	90c	80c	85c
Chollar.....	3.05	2.65	2.60	2.80
Confidence.....	4.20	4.20	4.20	4.20
Con Imperial.....	3.05	2.85	1.30	2.80
Con Virginia.....	3.05	2.85	1.30	2.80
Crown Point.....	2.10	1.55	1.65	1.60
Con Washoe.....	15c	10c	10c	10c
Champion.....	40c	25c	1.05	75c
Concordia.....	40c	25c	1.05	75c
Dayton.....	20c	10c	10c	10c
DeFrees.....	20c	10c	10c	10c
Danay.....	20c	10c	10c	10c
Eureka Con.....	1.60	1.35	1.65	1.30
Excelsior.....	1.60	1.35	1.65	1.30
Endowment.....	1.60	1.35	1.65	1.30
Gen Thomas.....	1.60	1.35	1.65	1.30
Grand Prize.....	1.60	1.35	1.65	1.30
Gila.....	1.60	1.35	1.65	1.30
Golden Charlotte.....	1.60	1.35	1.65	1.30
Golden Era.....	1.60	1.35	1.65	1.30
Goodshaw.....	35c	30c	30c	30c
Gould & Curry.....	4.60	3.70	4.65	3.80
Hale & Norcross.....	4.60	3.70	4.65	3.80
Hillside.....	4.60	3.70	4.65	3.80
Highridge.....	4.60	3.70	4.65	3.80
Homestake.....	4.60	3.70	4.65	3.80
Hussey.....	4.60	3.70	4.65	3.80
Independence.....	4.60	3.70	4.65	3.80
Julia.....	4.60	3.70	4.65	3.80
Justice.....	4.60	3.70	4.65	3.80
Jackson.....	4.60	3.70	4.65	3.80
Joe Scatena.....	4.60	3.70	4.65	3.80
K. K. Con.....	4.60	3.70	4.65	3.80
Kentuck.....	4.60	3.70	4.65	3.80
Kossuth.....	4.60	3.70	4.65	3.80
Keystone.....	4.60	3.70	4.65	3.80
Lady Bryan.....	4.60	3.70	4.65	3.80
Lady Wash.....	4.60	3.70	4.65	3.80
Leopard.....	4.60	3.70	4.65	3.80
Leviathan.....	4.60	3.70	4.65	3.80
Lee.....	4.60	3.70	4.65	3.80
May Belle.....	4.60	3.70	4.65	3.80
Modoc.....	4.60	3.70	4.65	3.80
Manhattan.....	4.60	3.70	4.65	3.80
Martin White.....	4.60	3.70	4.65	3.80
McClintock.....	4.60	3.70	4.65	3.80
Meadow Valley.....	4.60	3.70	4.65	3.80
Mexican.....	4.60	3.70	4.65	3.80
Middleton.....	4.60	3.70	4.65	3.80
Morning Star.....	4.60	3.70	4.65	3.80
North Con Virginia.....	4.60	3.70	4.65	3.80
New York.....	4.60	3.70	4.65	3.80
Northern Belle.....	4.60	3.70	4.65	3.80
New Coso.....	4.60	3.70	4.65	3.80
Nevada.....	4.60	3.70	4.65	3.80
Occidental.....	4.60	3.70	4.65	3.80
Ophir.....	4.60	3.70	4.65	3.80
Oriental.....	4.60	3.70	4.65	3.80
Overman.....	4.60	3.70	4.65	3.80
Panther.....	4.60	3.70	4.65	3.80
Phenix.....	4.60	3.70	4.65	3.80
Phil Sheridan.....	4.60	3.70	4.65	3.80
Potosi.....	4.60	3.70	4.65	3.80
Prospect.....	4.60	3.70	4.65	3.80
Raymond & Ely.....	4.60	3.70	4.65	3.80
Richer.....	4.60	3.70	4.65	3.80
Rock Island.....	4.60	3.70	4.65	3.80
Rye Patch.....	4.60	3.70	4.65	3.80
Rough & Ready.....	4.60	3.70	4.65	3.80
Savage.....	4.60	3.70	4.65	3.80
Seg Belcher.....	4.60	3.70	4.65	3.80
Sierra Nevada.....	4.60	3.70	4.65	3.80
Silver Hill.....	4.60	3.70	4.65	3.80
Silver King.....	4.60	3.70	4.65	3.80
Silver Prize.....	4.60	3.70	4.65	3.80
Succor.....	4.60	3.70	4.65	3.80
Summit.....	4.60	3.70	4.65	3.80
Scorpion.....	4.60	3.70	4.65	3.80
Solid Silver.....	4.60	3.70	4.65	3.80
South Bodie.....	4.60	3.70	4.65	3.80
Star.....	4.60	3.70	4.65	3.80
St. Louis.....	4.60	3.70	4.65	3.80
Syndicate.....	4.60	3.70	4.65	3.80
Tioga Con.....	4.60	3.70	4.65	3.80
Tiptop.....	4.60	3.70	4.65	3.80
Trojan.....	4.60	3.70	4.65	3.80
Union Con.....	4.60	3.70	4.65	3.80
Utah.....	4.60	3.70	4.65	3.80
Vermont Con.....	4.60	3.70	4.65	3.80
Ward.....	4.60	3.70	4.65	3.80
Wells Fargo.....	4.60	3.70	4.65	3.80
Woodville.....	4.60	3.70	4.65	3.80
White Cloud.....	4.60	3.70	4.65	3.80
Yellow Jacket.....	4.60	3.70	4.65	3.80

Sales at S. F. Stock Exchange.

Thursday A. M., Nov. 4.	490	Savage.....	2.15	2.10
240 Andes.....	80c	175 Utah.....	1.10	1.10
1470 Alta.....	32.70	90 Union.....	1.10	1.10
325 Belcher.....	1.85	710 Yellow Jacket.....	3.30	3.30
210 B & Belcher.....	2.10	.....	.....	.....
80 Bullion.....	2.10	.....	.....	.....
1040 Benton.....	1.20	700 Arizona.....	2.30	2.30
65 Confidence.....	3.70	130 Boston.....	1.10	1.10
10 Con Imperial.....	20c	200 Bechtel.....	1.30	1.30
20 B & Belcher.....	2.10	50 Bodie.....	1.10	1.10
825 Crown Point.....	1.05	20 Bodie.....	1.10	1.10
240 Chollar.....	2.20	270 Booker.....	1.15	1.15
100 Challenge.....	1.75	110 Belvidere.....	1.15	1.15
230 Excelsior.....	1.05	200 Concordia (Va).....	1.15	1.15
450 Gould & Curry.....	3.80	100 Goodshaw.....	1.15	1.15
445 Hale & Nor.....	3.35	980 Columbia.....	2.20	2.20
550 Justice.....	3.80	50 Eureka Con.....	1.15	1.15
100 Julia.....	3.80	200 Grand Prize.....	1.15	1.15
150 Lady Wash.....	3.80	100 Goodshaw.....	1.15	1.15
170 Mexican.....	3.80	100 Nevada.....	1.15	1.15
150 New York.....	3.80	600 N. Belle.....	1.15	1.15
270 Ophir.....	3.80	50 Noonday.....	1.15	1.15
65 Overman.....	3.80	600 Paradise.....	1.15	1.15
125 Silver Hill.....	3.80	100 Silver King.....	1.15	1.15
270 Scorpion.....	3.80	75 Tioga Con.....	1.15	1.15
200 Sierra Nevada.....	3.80	.....	.....	.....

The Osmanli, of Constantinople, says: "Let those who accuse us of perfidious procrastination come and see, as we see, the misery of our position; come and feel, as we feel, the tortures of our agony. We are not afraid; we are starving. Usury is devouring us. Poverty is seated under the shadow of the palace. It is only by ruinous loans that a pittance can be doled out to the humblest officials. An unfortunate clerk cannot obtain a couple of liras without an imperial order."

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Alpha Con M Co	Nevada	13	100	Oct 27	Nov 30	Dec 21	Wm Willis	309 Montgomery st
Albion Con M Co	Nevada	4	25	Sep 29	Nov 3	Nov 22	T B Chisholm	327 Pine st
Amador Canal & M Co	California	5	100	Sep 21	Nov 2	Nov 2	R N Van Brunt	318 Pine st
Belcher S M Co	Nevada	25	75	Nov 3	Dec 6	Dec 27	J Crockett	327 Pine st
Benton Con M Co	Nevada	4	50	Oct 7	Nov 30	Dec 20	W H Watson	302 Market st
Champion M & M Co	Cal	8	25	Oct 4	Nov 9	Nov 30	John Crockett	327 Pine st
Chadron M Co	Dakota	9	80	Oct 13	Nov 11	Dec 6	W F Verdenal	327 Pine st
Caledonia S M Co	Nevada	32	25	Sep 14	Oct 20	Nov 10	R Wegner	414 California st
Crown Point G & S M Co	Nev	43	50	Oct 7	Nov 18	Dec 10	James Newlands	327 Pine st
Butte Creek Hydraulic M Co	California	6	15	Sep 12	Oct 27	Nov 15	R L Taylor	320 Montgomery st
Excelsior M Co	Nevada	16	05	Oct 7	Nov 10	Nov 30	O E Elliott	327 Pine st
Goodshaw M Co	Cal	7	25	Oct 1	Nov 1	Nov 8	A F Main	309 California st
Hale & Norcross M Co	Nevada	66	75	Oct 4	Nov 8	Nov 30	J F Lichtner	309 Montgomery st
Justice M Co	Nevada	33	50	Sep 13	Oct 18	Nov 8	R F Kelly	419 California st
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	Dec 10	C Van Dyke Hubbs	310 Pine st
Martin White M Co	Nevada	7	50	Sep 14	Oct 24	Nov 15	J F Stoville	309 Montgomery st
Maryland Con G & S M Co	Cal	2	15	Aug 13	Sep 15	Oct 30	E P Farnsworth	202 Sansome st
Mexican M Co	Nev	13	100	Sep 23	Oct 28	Nov 17	C L McCoy	309 Montgomery st
Monte Christo M Co	Cal	4	10	Sep 21	Nov 1	Nov 29	B Burris	309 Montgomery st
Monro G M Co	Cal	9	50	Oct 13	Nov 19	Dec 9	W H Lent	309 Montgomery st
New York M Co	Nevada	44	100	Oct 4	Nov 13	Dec 3	D P Thomas	327 Pine st
Savage M Co	Nevada	44	100	Oct 4	Nov 5	Nov 26	E P Holmes	319 Montgomery st
Silver Hill M Co	Nev	12	30	Sep 17	Oct 21	Nov 11	W E Dean	309 Montgomery st
San Francisco Copper M Co	Cal	5	50	Sep 15	Oct 15	Nov 15	R H Pond	258 Market st
Tellurium M Co	Cal	23	10	Oct 17	Nov 17	Dec 14	J M Litchfield	415 Montgomery st
Tioga Con G & S M Co	Cal	2	15	Oct 13	Nov 17	Dec 14	J M Litchfield	415 Montgomery st
Tioga Con M Co	Cal	11	15	Sep 17	Oct 22	Nov 11	W H Lent	309 Montgomery st
Yellow Jacket M Co	Nev	39	100	Oct 6	Nov 10	Dec 8	Mercer Otley	Gold Hill Nevada

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Arizona Prospecting & M Co	Arizona	2	05	Oct 8	Dec 4	Dec 22	O E Travers	331 Montgomery st
Armand G & S M Co	Cal	2	05	Oct 21	Nov 30	Dec 20	J L Fields	240 Montgomery st
Belmont M Co	Cal	26	15	Oct 3	Nov 13	Dec 13	J F Faw	310 Pine st
California G M Co	Cal	2	50	Oct 5	Nov 9	Nov 30	E F Stone	306 Pine st
Calumet M Co	Mexico	2	20	Oct 13	Nov 17	Dec 15	E B Holmes	309 Montgomery st
Cedar Hill Con M Co	Nevada	2	100	Sep 7	Oct 8	Nov 8	G A Rans	320 Sansome st
Commonwealth Con M Co	Cal	3	10	Oct 9	Nov 12	Dec 2	Chas A Morse	217 Sansome st
Cumbarland & S M Co	Arizona	2	30	Oct 27	Nov 30	Dec 24	J H Griffiths	328 Market st
Day S M Co	Nevada	7	15	Sep 22	Oct 25	Nov 22	J W Pew	310 Pine st
Dudley S M Co	Cal	10	25	Sep 25	Oct 18	Nov 10	E C Masten	309 Montgomery st
Excelsior G M Co	Cal	13	10	Oct 20	Nov 4	Dec 15	D B Chisholm	327 Pine st
Excelsior G M Co	California	5	05	Sep 4	Nov 4	Nov 25	J M Buntington	309 California st
Hazard Gravel M Co	Cal	6	10	Sep 27	Oct 27	Nov 15	J T McGeehan	318 Pine st
Leeds M Co	Utah	2	10	Aug 25	Oct 4	Nov 1	T B Chisholm	327 Pine st
Mt Potosi Cons M Co	Nevada	5	25	Oct 12	Nov 15	Dec 6	E A Holmes	316 Pine st
Monro G M Co	Nevada	3	05	Oct 13	Nov 19	Dec 9	W H Lent	309 Montgomery st
Mount Rose M Co	Nevad	3	05	Sep 10	Oct 18	Nov 9	L Herman	220 Sansome st
San Jose M Co	Nevada	17	20	Oct 12	Nov 2	Dec 7	A Carrigan	309 Front st
Tuscarora M & M Co	Nevada	7	15	Oct 30	Dec 4	Dec 27	M F Sperling	309 California st
Wide Awake Prospecting M Co	Cal	11	10	Oct 18	Nov 25	Dec 18	O Hildebrandt	222 Sutter st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Clayton Queen M Co	California	Jas Edwards	330 Pine st	Annual	Nov 15
Golden Gate Con M Co	California	J F McGeehan	318 Pine st	Stockholders	Nov 9
Harrington M Co	California	O O Miller	324 Pine st	Annual	Nov 16
Maryland Con M Co	California	E F Farnsworth	202 Sansome st	Annual	Nov 12
Peck M Co	Arizona	O T Bridge	224 California st	Annual	Nov 18

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	60	Sep 15
Golden Era M Co	Nevada	J K Goodrich	309 Montgomery st	10	Sep 21
Grand Prize M Co	Nevada	E M Hall	327 Pine st	25	Sep 21
Indian Queen M Co	Cal	Grove Adams	Merchants' Ex	10	Oct 25
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	10	Oct 30
Northern Belle M & M Co	Nev	Wm Willis	309 Montgomery st	50	Sep 15

THE SEBASTOPOL MINE.—The Sebastopol mine, in Grass Valley district, continues to present well, and the work of its development is attended with very satisfactory results. A crushing will be made shortly.

CENTENNIAL MINE.—A private letter received here states that work on the Centennial mine, in Washington township, which has been suspended during the past summer and fall, will be resumed soon.

PLACER.

YUBA DITCHER.—Dutch *Fall Forum*, Oct. 30: We understand the work of replating the South Yuba Co.'s ditches is being rapidly pushed ahead and in a short time the whole line of ditches owned by that company will be put to thorough repair, when the water will be turned into them. The Polar Star and Southern Cross mines will be started up as soon as the water is turned into the ditches.

EXPLOSION.—Placer *Argus*, Oct. 30: A man named Boynton had both eyes blown out and received other severe injuries by a powder explosion while at work in a mine of the Julian mine, near Newcastle, last Sunday morning. He was in the act of removing a charge which hung from the ceiling when the explosion occurred.

FATAL ACCIDENT.—James T. McLean, superintendent of the Rock Creek mine, situated about 3 miles north of Auburn, was instantly killed by the fall of an iron mortar, which was being hoisted into place at the mine on the 23d. The mortar weighed 3,700 lbs., and was about being placed on a large block of iron when McLean reached in under to brush away some dirt or gravel that was on the blocks. Just at this moment the rope that held the mortar snapped and the unfortunate man was caught as if in a trap, his head and shoulders being crushed into an unrecognizable mass.

PLUMAS.

ANOTHER BIG STRIKE.—Quincy *National*, Oct. 30: The Cherokee company, near Round Valley, struck a ledge in the new shaft, at a depth of 40 ft., which is 8 ft. in width and prospects at from \$15 to \$50 per ton. They had run 6 ft. on it at last accounts, and it was as wide there as where they cut it. The company is hauling rock from the Bellas and Kettle ledges to the Kettle mill, which will start early in the week.

QUARTZ.—A new correspondent, signing himself "Star," gives us a few mining items, as follows: He dates his letter from the North Star mine. Times are waking up; quartz is rising. Your correspondent has been prospecting for a ledge about 2 miles north of Eureka for the last 3 years, and has finally succeeded in finding a well-defined quartz vein, extending a tunnel 250 ft., which is 12 ft. in width, and is 12 ft. in thickness, and prospects big is free gold. We have no way of working it, except by a strata process, and that is very slow. John Swan has located a placer claim on Squirrel creek, which many think is a splendid mine. Mobawak is beginning to look up as a quartz district. Mr. Newman will soon have a mill at work on his mine, put up by a Nevada company.

ORAVEL.—Greenview *Bulletin*, Oct. 28: In the Monte Christo mine, at Spanish Peak, exceedingly rich gravel is reported as having recently been found, far in advance of anything heretofore seen in the country.

THE BADGER HILL MINE.—Plumas valley ditch company has been bonded to Eastern capitalists for over \$200,000. It is their intention to literally corral all the water in that vicinity into huge reservoirs, and thus work extensive claims near there and in Butte valley.

BUSINESS.—The Plumas National mining company, with its new concentrators have been successfully working since the 16th inst., and their new building is in readiness for the furnace, which is now on the way from Chico. The assay building is also almost completed, and everything is being pushed forward as rapidly as possible.

MR. M. B. BRANSFORD, Superintendent of the Atlantic & Pacific, near the Cherokee, has let a contract to George O'Connell to build a 20-stamp mill at the mine to be run by steam. The machinery will be made by the Greenville Iron Works. Mr. Bransford has added his force of miners and will open out a new tunnel. There is a well-defined ledge in sight and this prospect good. We learn that a wood contract will soon be let; the company has advanced money to make the first payment on the mill, and more is ready.

INDIAN VALLEY.—Mr. Wm. Skinner, foreman of the Indian Valley mine, has a force of men at work in the old Union tunnel, to strike the Indian Valley shaft. They are in 1,900 ft. at present, and at this date they have 134 ft. more to run to strike the shaft. The rock is soft at present, and if it continues so, they will reach the shaft in 4 weeks. Mr. Skinner has a force of men also at work cleaning out the old Indian Valley tunnels. Mr. Skinner is a thorough miner, and will make things boom. Mr. W. F. Arnold, the Superintendent, has a large force of carpenters at work on the old Union mill, repairing the inside. They have the boiler from the Indian Valley mill, and will run the engine with 2 boilers, which will run the 24 stamps and the rock breaker. The mill will be fed by self-feeders. The cars will run directly from the mine to the mill. The mill will be ready to run Dec. 1st.

THE SATEVCO MINING COMPANY, near Prattville, is having long timbers sawed at Lawrence's mill which are 25 inches square.

RUSH CREEK MINES.—Quincy *National*, Oct. 28: At the head of the creek we find H. Hoffman & Co. running their 9-stamp quartz mill from \$10 to \$14 rock, from their ledge which was opened 3 years ago. They are now having a new smaller string which assays \$175 per ton. They have struck another ledge about 1 mile below the mill, which is 7 ft. wide and shows finely. Further down the creek Roadie & Fritsch are taking out some fine specimens from their gravel mine. Martin & Huffman are running a tunnel for a gravel channel, near the old Bull Frog mine, with good prospects ahead. Mining has been going on at Rush Creek since 1851, and it once was a very lively mining camp. The present prospects indicate that it will be lively again. A number of Obinamen are at work in the old creek and getting good pay.

SIERRA.

RUBY.—Mountain *Messenger*, Oct. 30: Six carpenters are now busy at the Ruby gravel mine, 3 miles northwest of the Ruby City, in addition to 20 laborers engaged in grading and other work. A road has been put in from the old Piochone down Rock creek. A boarding house and powder warehouse—containing 10 tons—have been recently constructed. New machinery for running a Burelligh drill, and a good second-hand compressor, have arrived at the mine. Contractors, James Bradbury and James O'Connell, are now working on 500 cords of wood. Twenty-five tons of working material and winter provisions are en route from the lower markets. The Ruby has one of the best tunnels in the State, now in air-line 230 ft. through a formation of hard quartzite. Under the able direction of Supt. H. W. Wallis, and his foreman, A. Ravannah, work will be vigorously prosecuted for the best interests of all parties interested.

THE BUTTE COMPANY at the Gold Bluff mine will be ready to commence crushing next week. They have no difficulty in keeping the water out by "Chinese cheap labor" with a hand pump. The workmen are sinking on the ledge at a point where over \$3,000 was taken out in a few weeks when the last work was done on the ledge.

PROSPECTING above Sierra City is in steady progress, and more and more is confidently expected that several good paying gravel mines will be added to the list in that portion of the county. Quartz interests also are looking up some in that direction.

GOOD HEADWAY.—The Savage gravel company is now making 40 ft. of tunnel a week with their Ingersoll Burelligh drill, through slate and granite.

THE WILLOW CON. MINE.—Work will be commenced on the Willow Con. mine, with 2 shifts of men, in a few days. The company intend to push this winter.

TRINITY.

QUARTZ SALE.—Trinity *Journal*, Oct. 30: We learn that Waver Sebastian, of Deadwood, has disposed of his quartz claim in that district to San Francisco capitalists. This has been one of the best ledges ever discovered in Trinity, and with machinery and extensive working will doubtless prove as good as can be found any where.

NEW RIVER.—Since water gave out, little of interest to anyone has transpired here. Very little mining has been done on this river for 2 months past, with this exception at a few places where the Chinese have wing-dammed the river, and those have met with more or less success. The shrewd of the miners are now getting ready for the coming season, such as cleaning ditches, repairing flumes, etc., while others, as usual, wait to do all such work until the rains set in, and thus lose the best of the season's work. These last, of course, next spring will have but little to show for their winter's work and will throw the blame upon "a poor winter for mining; no gold in the ditches," etc. If it is comparatively dull above, such is not the case a few miles below here; I mean at the New River hydraulic mining company's work. The company has at present some 70 or 80 white men and about the same number of Chinese at work for them. The most pressing work, of course, is the erection of a dam across the river, and things are pushed with the greatest possible activity on it, no less than 60 men being at work at this. Others are busy on erecting a steam saw-mill to cut the lumber necessary for the flume, while others are grading, bining, logging, etc. It is said that this winter has been a very successful one for the company, and seems hardly possible, but Mr. J. Lufkin, the contractor, seems to know what he is about, and is confident of success. The boiler, steam-rim and smoke-stack of the mill are ready to be put in position, and the engine is expected to be in soon from the city. The boiler is a big tubular one about 14x4 ft. and of course had to be put together here, the iron having come from the city ready cut and punched. The mill, it is said, will cut 20,000 ft. of lumber per day. The camp itself reminds one of the days of early mining, and looks like a large village. There are at present 2 hotels, 3 saloons and 1 store, and other buildings are being put up at a rate of about 2 every week, while mule trains come in with supplies and material from 3 to 4 times a week. The contractor pays the men from \$2.75 to \$3 per day without board, the latter costing \$6 per week.

TUOLUMNE.

IMPORTANT STRIKE.—Tuolumne *Independent*, Oct. 30: Last Tuesday a very important strike of rich rock was made in the south shaft of the Evans mine, at 42 ft. in depth, where a rich feeder entered the shaft from the footwall side. In about 10 ft. more in depth it is expected the vein, sunk on the feeder, will make together when, if it continues as rich as at present, the low chute which this shaft exposes may outrun any former development on this valuable property. Supt. Silver has shown us the prospect from this new chute (which is about 300 ft. from the present rich ore body) taken from a small quantity of decomposed quartz, which is considered, in mining parlance, a big thing. The gold is coarse and bright.

NEVADA.

WASHOE DISTRICT.

The following statements were made on Nov. 2d in regard to the leading mines:

BECKER.—On the 2760 level the east crosscut from opposite the station is in 157 ft. The face shows quartz and porphyry. On the 3000 level the south drift is in 453 ft. from the incline station. The face is in fine-looking quartz and some porphyry. Some necessary repairs have been done on the boilers. A substantial floor has been put in the engine-room at the pump shaft.

ORVINO.—Our mine has been generally timbered 22 ft.; total depth below 1000 level, 238 ft. The material we are now sinking in is hard, gray porphyry. We have completed the station for the engine at the bottom of the upraise and put the engine in place.

CON. IMPERIAL.—The north drift, 2135 level, is in 75 ft. It will require the remainder of this week to complete the timbering of the shaft.

CATERPILLAR.—Our mine has been run an average of 14 hours per day, consuming 5 cords of wood per day. On the Forman shaft we have made good progress in cutting stations at the Suro tunnel level and for the 1500 pump and balance box.

BELMONT DISTRICT.

THE BARCELONA MINE.—Belmont *Courier*, Oct. 27: The Barcelona mine is undoubtedly one of the most promising mines in eastern Nevada, the ore being of a high grade, and as the work progresses the ore bodies look more and more encouraging. Reduction works are badly needed near the mouth of the tunnel. Enough ore can be easily extracted to keep a 20-stamp mill pounding away for years. Some of the ore is of a high grade, and the mineral belt well worthy the attention of capitalists, and they may rest assured that they will never regret the expenditure of any money they may put up for their development.

BRISTOL DISTRICT.

AN OPINION.—Pioche *Record*, Oct. 27: Mr. John A. Church, the expert sent here to examine the Hillside property by the Easterners, was agreeably disappointed upon his arrival in Bristol. He went there expecting to see old and dilapidated works, but upon discovering that everything was new, with the latest improvements, he did not feel like to express his opinion. The Hay State, in Bristol district, recently purchased by the Hillside company, spoke highly of and estimated 1,200 tons of ore in sight. He was so well satisfied with the management of the affairs of the company at Bristol, and the high things that he saw, that he decided not to go down to San Francisco to examine the books there, as was his intention.

BRISTOL CO.—The Bristol company is experiencing considerable trouble by the continual breaking of the pump shaft at the wall. The Mayflower mine is improving work progress, and there is no telling how valuable that property may eventually prove.

CENTRAL DISTRICT.

RICH ORE.—Silver *State*, Oct. 27: S. W. Hammond had a lot of 376 lbs. of ore from the Hammond mine, in Central district, worked at the Humboldt reduction works. It yielded 163 lbs. of bullion of the assay value of \$244.50, or at the rate of \$1,203 per ton. That is good enough ore for anybody.

CHERRY CREEK DISTRICT.

STARTED UP.—Ward *Reflex*, Oct. 23: The Exchange mill and mine, at Cherry Creek, we are informed by Geo. W. Parker, has been started up with a force of 25 men. The first bar of hullion was shipped on the 21st.

DUN GLEN DISTRICT.

ENCOURAGING.—Silver *State*, Oct. 27: Very encouraging reports from the Dun Glen mine are received. The Lang Syne continues to yield the usual supply of ore, and the 10-stamp mill is running steadily. An officer of the company from New York visited the mine a few days ago, and is said to have been well pleased with the prospects. The outside mine, on which work is being carried on, are looking well, and the general outlook is as good as could reasonably be expected.

EUREKA DISTRICT.

A REPORT.—Sentinel, Oct. 23: It was reported on the street last night that the workmen in the Eureka tunnel had run upon a body of ore, 14 ft. across the face of the drift. Inquiries at headquarters were of no avail, and the reporter went away none the wiser.

HOLISTO.—From a gentleman who took run over Parkersburg mine, it is confidently expected that ore-hoisting is going on slowly at the Williams, the Silver Connor, Williams & McNaughton and several other mines, but work will not be pushed until after election.

I X L DISTRICT.

MILL.—Reno *Journal*, Oct. 27: J. W. Richards, of Churchill county, informs us that negotiations are pending between capitalists and the owners of one of the leading mines of I X L district for the erection of a mill. If an agreement is effected, Mr. Richards thinks I X L will be heard from soon.

KINGS RIVER DISTRICT.

LOOKING WELL.—Silver *State*, Oct. 25: Richard Merritt, who has been prospecting the Good Hope mine, on Kings River, informs us that the ledge is looking splendidly

diddly and carries considerable gold and silver-bearing ore. A shaft has been sunk on the lead to the depth of 65 ft., and the ledge is about 5 ft. wide at the bottom of the shaft.

PROSPECT MOUNTAIN DISTRICT.

SPRING VALLEY.—Eureka *Sentinel*, Oct. 30: Mr. E. H. Rose has been over, with some workmen, on the west edge of Prospect Mountain district, opening up and developing the Woodchopper and Five-Twenty mines. He returns this morning with supplies, and says he is much encouraged with the present outlook of the above-named properties.

SECRET CANYON DISTRICT.

NOTES.—Eureka *Sentinel*, Oct. 29: Capt. Foley told us about Judge Dougherty driving a tunnel through a belt of argillaceous slate to strike at depth the great ore body that extends from the Geddes & Bertrand mine through Austin hill. If the tunnel is continued, other bodies of ore will be struck upon the contact, for it is a fact that where the contact is found in Prospect mountain and its spurs, ore bodies are found. Another tunnel, the Imperial & Hart, is being driven by Joel Dodge to tap a body of rich ore that lies in Austin hill, immediately ahead of the tunnel. The Berryman Bros. are contemplating driving another tunnel through some of the spurs of Prospect mountain on the west side. On the east side of the canyon, Pat Devlin will soon run a tunnel for the ore channel known to exist all the way from Ruby Hill to the Page & Corwin. In the Foley & Hansen tunnel, which is in some 100 ft., we noticed a small seam of ore which is very rich. It is a good, roomy tunnel, being about 01x4 ft.; is being driven through the great slate belt to strike the Commodore, Foretop and Foley mines, and the running upon such a prospect is not to be "snatched at" in so short distance. Doc Hamilton and E. R. Dennison are working on lease one of the Geddes & Bertrand series in Cave canyon. D. J. J. McLaughlin is still running a gang of men at the Irish Ambassador. Further away to the southwest is the Menagerie Groupe, the Lion, the Tiger and Leopard, owned by Pope & Co. They will finish up assessment work after the 1st of next month. Back of them is the famous Page & Corwin, the Marston and Guilford's White mine. They are all good properties, and will be worked this winter. Parties are now working the Monroe on lease, and the Scorpio mine is being worked by Messrs. Lamoureux & Potter.

WARD DISTRICT.

CROSSCUTTING.—Ward *Reflex*, Oct. 29: Crosscutting was commenced in the Martin White main tunnel last week at a point 2,000 ft. from the mouth, on the south side of the tunnel. This crosscut is headed for the old Clay chamber, where a large body of ore was found in the upper workings.

ARIZONA.

SILVER DISTRICT.—Territorial *Explorer*, Oct. 29: The Silent mine is increasing its force to 100 men as rapidly as possible, to keep the 3 1/2-mile teams, with trail wagons, busy on their 20-ton contract. A 500-ft. vertical shaft, 7x16 will be commenced at an early day on the Mesa and pushed as fast as money and muscle can drive it, and when the ledge is tapped stoppage will be started. The bottom of the present shaft shows the richest body of ore yet struck. A force of men, under the superintendency of Mr. Williams, of San Francisco, is rushing the furnaces at the river, but it will yet some time ere the "frying" commences. There are now 9 wagons rolling in the camp, and they appear to have all they can attend to. The teams owned by the Silent and Iron Cap Co.'s go to Yuma this week to haul in a lower for the furnace. It comes from the "Iron" Co. W. Wilson, of the Silent, arrived from California on the 22d.

SILVER KING.—Silver *Belt*, Oct. 27: A well-known citizen from this place, just returned from Silver King, gives us a wonderful account of the richness of the Silver King mine. The ore is accumulating so rapidly on the dumps that even the 20 stamps, as well as the concentrators and newly erected leaching works, are insufficient to keep up with the production of the mine. The ore contains so much free silver that a force of 4 men is employed in separating the pure metal (silver specimens) from the ore hoisted to the surface; boxing it ready for shipment to San Francisco. The last dividend declared only a few days ago in addition to a heavy reserve fund in the company's vaults substantiate fully all the good news we are constantly receiving from that king of silver mines in Pinal county.

OLDFIELD DISTRICT.—Silver *Belt*, Oct. 26: Winne, Thomas & Barnes have sunk a shaft on the Nantucket, 26 ft. deep, and found a body of ore 3 ft. wide which averages \$75. Charles Hayse had 140 tons of Emeline ore worked at the Baldwin mill which gave eminently satisfactory results. W. Lowther has finished a contract on the Aztec mine, of sinking 50 ft. in the shaft. That makes it 100 ft. deep. It is in ore all the way, but it is low grade. We were shown to-day some of the ore they are taking out of the Centennial mine. It is immensely rich. Excellent news reaches us from the Nugget, and from what we consider a reliable source. At 130 ft. they are taking out as rich ore as the mine has yet produced. There is 3 ft. of this rich ore, the balance of the vein carrying what would be considered a low grade. That makes it 100 ft. deep. Since the slight alterations in the Townsend mill it 5 stamps "wake the echoes" of the beautiful valley of Lost Oulch daily and nightly. This is a real little gem of a mill, and will repay any pleasure parties that are out riding to make it a visit and see how gold bullion is produced. The Olden Eagle mill is fast approaching completion, and when finished, will be the largest and best gold quartz mill in the district. The shafting and the 6 stamps are already in place.

MINERAL CREEK.—Gold *Chronicle*, Oct. 24: Mr. Sands, Dr. Lawrence and others have made some discoveries of very valuable ore that show indications of permanence. These discoveries, together with the fine ledge found by the Mineral Creek M. & Co., along the line of their main tunnel, speak well for the staying quality of ore in this camp. The fact that the company has undoubtedly a fine mine, judging from the appearance of the ledge and quality and quantity of ore now exposed. The mill is well toward completion, and the time is not far distant when bullion shipments will show the world that Mineral Creek has a bright future in store for it.

IDAHO.

IDAHO BULLION.—Silver *State*, Oct. 23: The following bullion shipments were received at Wells, Fargo & Co.'s office to-day from Idaho: Two bars, valued at \$3,501.30, from Silver City; 4 bars, valued at \$4,532.23, from Banner, and 4 bars, valued at \$4,133, from Atlanta.

BOISE COUNTY NOTES.—Yankee *Fork Herald*, Oct. 23: Operations have been going on for some time at Shaw's mountain, there being some law suits pending on them that cannot be settled till the August term of the District Court. A good deal of ore from them was worked in Plowman's mill this year and payed well. As soon as they are out of litigation work will be resumed and Boise and Ada counties will reap much benefit from them. The Gold Hill mill, at Quartzburg, commenced running on a high grade ore, and the owners are every day growing more wealthy. Work of development is still going on in the town mine, which is looking splendidly. This mine is the east extension of the Gold Hill, and at one time yielded a large quantity of exceedingly rich ore. The pay chute has again "come in" in the Sub Rosa, which is 9 miles from Idaho City, in Gambrinus district. The ore now being taken from it is a fine one. The mine is now being worked by Banner. The Wolverine shaft was down 203 ft. as usual at Banner. We were on our return. At the depth of 225 ft. a crosscut is to be run for the vein preparatory to stopping. All the mines in the district are looking well, and Banner will before long be the banner district of Boise county. The mill was to have ceased crushing Wolverine ore and started up on 100 tons from the Banner last week. The attention than heretofore is being paid to quartz. There are so many good ledges through that whole section of Idaho that it looks strange quartz has not received more attention in the past. Now that the people are looking in the right direction there is no doubt but that in the near future several more mills will be erected and general pros-

perity prevail. The anticipated good times coming, however, could be hurried if the owners of the mines would send specimens of their ore to California and Eastern companies and offer inducements to men acquainted with them to negotiate sales.

MONTANA.

STUCK UP.—Butte *Miner*, Oct. 20: It is our pleasing duty this morning to announce that they have "struck it" the Opheim. Since sinking was resumed on Thursday last, at which time the vein was about 12 inches above a depth of about 4 ft. has been added to the shaft, and the vein has widened to 4 ft. and carries ore samples of which assay as high as \$240 per ton. There is little doubt now that a large body of high-grade ore will be uncovered. Mr. Allen is certainly to be congratulated.

THE PARROT SMELTER.—Ore was yesterday broken for the Parrot smelter, southwest of the Silver Bow mill. The contract for this required amount of lumber, about 75,000 ft., has been let to Messrs. Thompson & Dodge, and the work of construction will begin immediately. The necessary machinery will be forwarded to Butte within the next few months.

FURNACE.—The matting furnace at the smelter of the Montana copper company was fired up yesterday. All the departments of the new works are in running order. The 1,500-ft. tramway leading from the mine has been completed, and ore is now regularly shipped over the track. The jiggers and vanners are doing excellent work, and the reverberatory furnaces, in which the ore goes through the desulphurizing process, are found to work to perfection. Considerable pulp has accumulated during the last week, as the matting furnace was not quite completed, but now that it has finally started up, we may expect that the fine copper matte shipments will soon be made to the refineries of the East.

LINGTON.—The stoppage west of the main working shaft continues to yield enough first-class ore to keep the Lexington stamps constantly busy. No striking is at present being prosecuted in the prospect holes west of the shaft, as enough work was done in them to prove the continuity of the vein in that direction.

MOUNTAIN BOY.—A very reassuring activity prevails in the development of this property, indicative of the faith the owners, Messrs. Wampler & Jackey, have in its permanence and value. The main incline has attained a depth of 200 ft.; a station has been cut for the 200 level and the sump is now being dug out. The vein in the bottom holds its own as to value, and has exactly doubled in width in the last 100 ft., being 15 inches wide at the first level.

MAONA CHART.—The depth of the main shaft is now 200 ft., and within the past few days crosscuts north and south have been started from the bottom to find out the precise location of the main ledge. At a depth of 65 ft. a 6-ft. vein of good ore, base in character, was passed through, but an attempt was made to follow it, as the main ledge is known to be much larger and is supposed to be of better quality.

BELL.—The Bell continues to add a heavy proportion to the ore product of the camp. The south vein, which yields only free ore, is improving almost daily, and is already in excellent shape to keep the stamps of the Clipper mill busy when the latter shall be fired up. The free ore dump contains almost 400 tons of ore. Regular shipments of ore continue to be made to the refineries of the East, and the mine may now be considered as having settled down to a solid, paying basis.

It may be positively stated that within 1 year from the present time, the stamp capacity of the Summit Valley mining district will be more than double what it is now, as there is no doubt whatever that 250 stamps will be in operation. The smelting capacity will be increased more than threefold.

NEW MEXICO.

GOLD.—News and Press, Oct. 21: Col. Bergmann brought in last week some fine-looking specimens of gold-bearing, decomposed quartz, from a new discovery above Clear creek on the Cimarron canyon. The ore has not yet been assayed, but if it goes even \$8 or \$10 a ton the mine will prove a bonanza, as the vein is clearly defined and 20 ft. wide of soft, easily-worked ore. Should this prove a valuable mine it will open up an entirely new district.

OREGON.

GALACE CREEK.—Democratic *Times*, Oct. 29: James Hansen of Galice creek, was in town this week, from whom we learn that great preparations are being made for the winter by the miners of that section. He is about putting pipe and a giant on some diggings he proposes working next season. Green Bros., of Galice creek, are taking out ore worth \$75 a ton, and have plenty of it in sight.

WALDO.—Wimer, Simmons & Co., of Waldo, were unable to clean up entirely, but they nevertheless took out nearly \$10,000 on their last run. Their previous clean-ups were also first-class. They no doubt have one of the best pieces of mining property on the coast, and expect to prove it before long.

UTAH.

BINGHAM.—Cor. Salt Lake *Tribune*, Oct. 23: The most noted experts have pronounced the mammoth gold belt of Bingham the most extensive ever yet discovered, taking in a scope of country 3 miles wide by 10 miles in length. Among the most prominent and valuable mines yet discovered on this belt are the Jordan, Stewart No. 1 and 2, Essex, Mineral Point, Overland, Highland Boy and Harriet, all of which show vast bodies of gold ore. Small capital and more enterprise is all that is required to develop this vast source of wealth. The Bonham, adjoining the Stewart No. 1, that two years ago was the Fort Sumner of Bingham, having a small army of men stationed there to protect it, we learn from good authority, is about to start up. The ore is to be milled in the Stewart No. 2 mill. The mine has immense bodies of ore in sight, some assaying up in the hundreds and averages about \$27 per ton.

FRISCO.—Times, Oct. 27: The new concentrating works at the Carbonate were started this week and work like a charm. The Horn Silver mine is not worked on Sunday now. The Horn Silver & Yolum will commence shipping iron from the Wah Wai the first of the week, and will employ all the teams they can get for the purpose. The Nahob mine, of which we have had occasion to speak 2 weeks since, shows up remarkably well. At a depth of 50 ft. the ore vein is 1 1/2 ft. thick, and indicates greater thickness as work progresses. The ore that is being taken out is exceedingly rich and the owners feel sure that they have struck a bonanza at last.

PINE GROVE DISTRICT.—From parties returned from Pine Grove a day or two ago, we learn that the numerous prospects in that district are looking remarkably well. The Carrie Lucille is opening out in grand proportions. Pine Grove holds fair to become one of the richest camps in Southern Utah, and that too in good authority.

SOUTH STAR DISTRICT.—A rich strike has been made by W. S. Martin, in South Star district, near the Creedmoor mine, between it and the Buckhorn. Two ore veins have been unearthed, one of carbonate ore 2 ft. thick, and another in close proximity 1 ft. thick, of solid galena and carbonate ore. The latter ore is very rich, and assay of it showed 70 ozs. silver and 70% lead to the ton. The best test that has been made in Star district for some time. We shall await further developments with interest.

SILVER REEF NEWS.—Miner, Oct. 30: One of the highest strikes, and by far one of the most important, that has yet been made in the camp, was made at the Buckhorn mine yesterday. A bonanza—the repeat working of the mine—which is simply immense, and the extent of which is yet unknown. The ore assays up in the hundreds, and is some of the prettiest rock we have ever seen in this district. It is needless to say that the Stormont folks are smiling clear to the back of their ears. The bullion shipments from Silver Reef through Wells, Fargo & Co. from the 14th to the 26th inclusive, aggregate the sum of \$19,867.12. Total for the month, to date, \$70,354.04.

The Remedy for the Phylloxera—No. 1.

EDITORS PRESS:—It is not here necessary to detail the enormous amount of destruction accomplished in our vineyards by this insignificant aphidian, the phylloxera. California has begun to groan under its effects. It has been found in most parts of the State, and many vineyards show by the yellow leaves, the drooping appearance of the vines, the greatly diminished crop of grapes and other accompaniments of the evil that this much dreaded "bug" is to figure largely in our grape interests in the future. Nor do I deem it necessary to enter into an entomological discourse on the phylloxera. Those whom this article may concern have already become sufficiently informed of its nature, habits and destructive propensities to appreciate the necessity of an immediate remedy for the evil. It is to this, therefore, that I propose to address myself exclusively.

The conditions favorable to the support of the phylloxera are found throughout the State. The insects thrive alike in rich and poor soil, on the red hill sides as well as in the rich, heavy loam of the bottom lands. Their influence may not be so well marked on strong luxuriant vines as on those of the poorer soil; but the conditions to support them are, nevertheless, there, and there are they found. Wherever the *Vitis vinifera*, or what is vulgarly termed the foreign varieties, exist, there may we look expecting to find, and if not finding, arrive at the unhappy conclusion that time is the only element necessary to produce them. France is at this day literally inhabited by them and has been subject to their depredations for many years past; but not until recently have they proved themselves so formidable as they now appear. Germany, Spain, Austria, Italy and other countries of less importance to the wine industry are badly infested; but France has suffered most. Her many hundred acres which have been rendered desolate are the world's principal monument to their destructive march. We are becoming injured now and are following in the wake of France. Therefore, let us see what France has done to prevent and remove, that we may not needlessly repeat her unfruitful efforts. Let us profit by her experience as far as available, and take up the work where she has left it. We may do this, because the California insect is found to be identical with those of France, the vines are the same and our soils have been proved to act similarly.

No nation could have acted more energetically than the French people have in this cause; prompted, as they were, by its influence on the national wealth, and robbing them, as it seems inevitable it must, of their most remunerative and important industry. Great prizes were therefore held out to those who should invent or obtain a remedy for the phylloxera. The greatest inducements have, ever since the advent of the pest, been held out to individuals and companies to experiment and try every means within their power, with what result we shall proceed to examine. But the question arises, shall we go over the same ground that they have? Fearing the impetuosity and hasty propensities of our California farmers, I am induced to present in what may follow the result of the study of the remedies for the phylloxera as far as it has concerned France.

The Records of French Experience.

The French have innumerable publications on this subject running back into 1865 and beyond. Among these many books and pamphlets we see the evidences of millions of dollars which have been spent in experimenting with different substances. Many methods were introduced and some largely entered into as money-making schemes, which, on authoritative examination, proved worthless, or nearly so. Among those most prominent were the sulphocarbonate of potassium, mixture of the green and heavy oil of anthracene, numerous antiseptics and "Rohart cubes." These and the many more worthless remedies have now all been abandoned for the two complete and only remedies as yet discovered, which together satisfy all the requirements. These are, inundation from 20 to 30 days where the land is such that it may be flooded, and where not such, the proper application of the bisulphide of carbon.

Now, any substance which will fulfill the following requirements is a good remedy. These are: First, there must be an easily diffusible, toxic atmosphere formed underground, which will kill all the phylloxera and not injure the vine; second, it must not be too expensive, and with proper directions expedient to apply.

The sulphocarbonate of potassium destroys wherever it passes; it favors the construction of the vine and serves to revive the vine when nearly dead, but the requisite most difficult to satisfy with any remedy here arises how to completely saturate the soil with it. M. Mouillefert experimented largely in 1875, and after many endeavors reported as follows: "Out of the many ways in which it might be applied the following is the most feasible, viz., to dissolve the salt in water, and with this water deluge each vine, in fact, the whole affected portion of the vineyard. This treatment will cost at the least 600 francs per hectare" (about \$50 per acre).

The oils of anthracene were found not sufficiently strong to kill the insect, although all combinations and proportions were tried. At a late date the plan was suggested and carried into experiment, of mixing these oils with the bisulphide of carbon, this latter being known to be a certain destruction to the phylloxera, but

owing to its easy and sudden volatility, and also to the fact that it injured the vegetation when applied directly in excess, it was deemed of no use unless it was mixed in such proportions as to remove these two difficulties. This was the plan, therefore, and, carried into effect, became quite famous about 1876. The bisulphide killed the insect and the oil of anthracene served as a carrier. Now it becomes plainly visible that if a means could be devised of applying the bisulphide directly, it would save the expense of the oil of anthracene and also a portion of the energy of the bisulphide, which it was afterwards proved conclusively to be absorbed by the oil, as it caused a sudden diffusion of the vapor of the bisulphide at first and then retarded it so as to diminish its effectiveness as a destroyer of the phylloxera. Such a means was soon devised of applying this bisulphide directly without injury to the vine, and in consequence the mixture was abandoned.

Another carrier of the bisulphide of carbon was a cube of wood. This saturated with the liquid and placed near the root of the vine effected the partial destruction of the phylloxera. These formed the famous "Rohart cubes" (which were tried unsuccessfully at Sonoma, in California). With the cubes as with the mixture aforementioned, we may observe that when the application, direct, of the bisulphide itself, which was to work the destruction, could be had, the carrier became a useless expense and also served to weaken the force of the vapors while they continued. The Rohart cubes became important for a time and did a great deal of good, but were afterwards superseded by the pure bisulphide.

It will be seen that carbon bisulphide has, as the essential element of destruction, entered into nearly all the remedies which have been proposed, but its beneficial effects were canceled under the names applied to the various mixtures.

It was long known that inundation was an effective means to the end, but owing to the hilly nature of the vineyards in France it seldom became available; furthermore, it came to be known that the bisulphide of carbon was efficacious, the only question being as to the manner of its application—how to kill the phylloxera and yet not injure the vine? We conclude immediately, that the proper procedure was to make careful experiments and determine its effect. The French people did, too, but not until it had, as we have seen, been many times ineffectually combined with other substances. In 1877 the pure unadulterated bisulphide received official attention, and by the experiments which followed it became and is now an effectual remedy.

The Bisulphide of Carbon

(Symbol CS₂ consisting in 100 parts of 15.8 parts of carbon and 84.2 of sulphur) was discovered in 1796 by Lampadius at Freiberg. When pure it is a colorless liquid, strongly refractive and exhibiting extremely bright colors when in the sunlight; its odor somewhat resembles that of chloroform; the taste is aromatic. Its specific gravity=1.2684; the boiling point is 54° Fahr.; consequently the liquid is very volatile at the ordinary temperature of the air. As commonly used, somewhat impure, it has a very disagreeable odor.

The bisulphide of carbon does not combine with water or spirits of wine; in ether and chloroform, however, it is freely soluble; it is an excellent solvent for resins, essential and fixed oils, caoutchouc, gutta-percha, camphor, sulphur, phosphorus and iodine. It is highly inflammable, burning with a red-blue flame; the products of complete combustion are sulphurous and carbonic acids. The vapor of bisulphide of carbon with oxygen or air constitutes an explosive mixture. It is used largely at present for industrial purposes. These purposes are very varied, but consist chiefly of the vulcanization of caoutchouc, the extraction of fat from bones and oils from oil seeds and olives, the extraction of sulphur, which dissolves freely in it, from its concomitant rocks and of fat from crude wool. It is used in electroplating to obtain a bright and polished surface, and is highly valued for killing all kinds of vermin in corn and grass, and the destruction of gophers and squirrels, for which latter purpose it has been found very valuable to California, and large quantities were last year consumed for that purpose.

Enough of its chemical properties. As an insecticide it was completely tested in 1877-78 by the *Comité Regionale*, instituted at Marseilles under the patronage of the *Compagnie des Chemins-de-Fer de Paris a Lyon et la Méditerranée*. Their experiments, as far as is consistent with an article of this kind, I propose here to give; knowing their results to be those of accurate determination, and that by authority rendered reliable by the high standing of those who were engaged in the prosecution of this work. The authenticity of this report is further proved by complete reliance on their results by the National Committee of France and all of the many societies and associations instituted for the purpose of investigating the phylloxera question. They are also cited as authority by all writers subsequent to their determinations.

The report is divided into two parts. The first comprising all the experimental results of the committee itself, both on a small and those on a large scale. The second part is devoted to the work of vine growers and experiments of each individual who has in his own vineyard tried, on a large scale, the action of bisulphide of carbon. Among these are included the leading vine growers about Marseilles and L'Hérault, etc.

The report is opened by M. A. F. Marion (Professor of the Faculty of Science of Marseilles and delegate of the Academy of Sciences), and I will give a resume of his introduction. He speaks of the progress the bisulphide of carbon has made as an insecticide, of what the committee have in their work accomplished, as evidenced by the consumption of this chemical, up to December 31st of 1879, to the extent of 1,972 barrels (100 kilograms per barrel), or a total of 433,840 lbs. avoirdupois; and further, that their experiments have proved the following, which he gives as one of the results attained: A single application at the rate of 20 grams of bisulphide per square meter permits the survival of from 6% to 8% of the phylloxera. With charges of 36 grams there remains from 2% to 4%, and it is only by the employment of 55 grams per square meter, if confined to a single application, that complete destruction of the insect has been accomplished, and this amount greatly injures the vine and may kill it if already weak from phylloxera. On the other hand, by two injections, from 4 to 6 days apart and 10 grams per square meter each time, there is found only 1% of the phylloxera living; sometimes they are all killed. By making this a total in the two applications of 28 to 32 grams per square meter, the total extinction of the insect is affected and the vine suffers no injury, a result which in a single application requires from 50 to 55 grams and risks the vine besides. He further remarks on the necessity of conforming exactly to their directions in order to realize the beneficial results which they have obtained, namely, the complete destruction of the phylloxera without any consequent injury to the vines. As to the time best adapted to the operations, he states as a conclusion of study of the different transformations the insect undergoes, of its metamorphosis and periods during which it exists in the winged form, and consequently could not be attacked by a subterranean application, that in winter when all are underground, in whatever form that may be, they are best available to the insecticide bisulphide. Furthermore, the diffusion of the vapor, owing to the colder weather and the moist condition of the soil, and also its uncultivated state, is much less rapid, and this is a great desideratum; that the vapor shall not pass off so suddenly as to have no effect on the parasites. The effect of the reagent on the vine itself is no more in summer than in winter, though, perhaps, more apparent in the color of the leaves, which, if the dose be large, are apt to turn somewhat yellow, or lighter, but in a few days regain their vigor and original color. However, this is of all other times the best, namely, during the winter before the agitation of the soil has begun by plowing. In the summer the phylloxera takes wings and does not enter the ground again until the last week of May. As soon, therefore, as they have gone down on to the roots another application is necessary, and this, the last, equal to the first in amount, completely terminates their existence. Because of the higher temperature of the summer the two successive applications, which in the winter should be 6 days apart, should in the summer be only 4 days apart. To sum up then, the bisulphide should be applied in doses of 14 to 16 grams to the square meter (usually put into two holes on opposite sides of the vines, 7 to 8 grams to a hole). Two such applications about the last of November or during December, with an interval between of 6 days; then again, soon after the month of May, repeat this double dose of 7 to 8 grams each to the square meter, with an interval of 4 days between the first and second application.

Mr. Marion closes his introduction by saying: "We are now permitted, after the operations which we have completely examined, to say that we are in possession of an efficacious method which has by practical proof resisted all difficulties; we do not desire that our statements appear preclusive nor prejudicial, but from all the proof we are convinced that the bisulphide of carbon will play the part of the all-important remedy in this great struggle against the phylloxera, in which no well wisher of our agricultural interests will be disinterested."

I will here remark that, in relation to the times for the best application of the bisulphide, the climate of California being very much similar to that of France, we may suppose that the changes which the insect undergoes are the same in California, and that the best times for the application would be similar—this is not definite, however, and until ascertained, we may have to rely principally upon the winter time, during which we are certain of catching all of the phylloxera within the area treated.

After the introduction by Mr. Marion, comes the "first part," in which are detailed experiments and the results obtained. These experiments I will, in the next issue, give more or less in detail. I will also sum up all the directions relative to the proper handling of the bisulphide of carbon, the instrument by which it may be injected into the ground, the dangers arising from its use (it being explosive and poisonous) and all that may apply particularly to California respecting the expense of using it, our plan for its immediate manufacture on this coast, and all else which may appear necessary on the subject of the remedy.

JOHN H. WHEELER.

San Francisco, Cal.

The recent large advance in lead and copper has greatly stimulated exploration and development in this class of mines, which promises to become one of the most important branches of mining on the coast.

Utah Mines.

"What's the mining outlook for Utah," asked a *Tribune* reporter of one of our prominent mine owners yesterday.

"The outlook is bright, was always bright, in this Territory, if men would only realize what they've got."

"What do you mean about realizing what they've got?"

"Why I mean this: If any other Territory or State in this Union turned out the same amount of refined bullion that we do right here, every man having an extra dollar to invest, would be breaking his neck trying to get there. But here we are actually shipping more bullion than Colorado, and yet you cannot pick up an Eastern paper that has not something to say about that State, but not a word about Utah. Look at your bullion receipts. The *Tribune* tells the whole story every morning in the 'City Jottings.' Money talks the world over, and we are turning out the money and doing it so quickly that men don't realize it."

"Have you seen the mine of Colorado?"

"I have been over the whole State. Why you don't suppose I am here for my health do you? The climate of Colorado is as good as this and the facilities for sliding out of there are better than they are here. That State is being cut up by railroads and towns are springing up every day. The class of people there are better than ours, and a man can get more fun for his money than he can get here. But that is all right. I am not ready to retire from business yet, and while I have any money to invest, Utah is my field."

"You feel that Utah, as a mining region, offers all the inducements capitalists require; but you must remember that the activity in mining matters here will not bear you out in your enthusiasm."

"I am enthusiastic because I am successful. If you mean by activity stampedes created by land speculators or railroad corporations, I am willing to admit what you say. But don't you stampedes. Where is the mine in Colorado that can show up like the Ontario, where is the camp in Colorado that yields bullion like Silver Reef and Frisco? There is not in the whole State of Colorado as much ore as there is to-day in sight and on the dumps of the mine around Frisco, Colorado! Why it's enough to make a mining man sick to read the exaggerated reports we read of that State every day in those Eastern mining papers. Colorado men will borrow \$20,000 to make a shipment and then go in debt \$5,000 advertising the shipment. Did you ever hear of Greg Chambers, Capt. Lubbock, the Stormont folks or the Horn Silver people paying out a cent to advertise the output of their mines? Not much."

"You have funny notions of your own on mining matters, but—"

"There you go. You ask me for my views and then laugh at them; but I have made money by my notions, as you call them, and am certainly very well pleased. You can etate in your paper that they may roam from the Gunnison to the Pole, and wander as far out of the way as they wish, mining men and capitalists have right here in Utah more ore to the square acre than any mining country I've been in, and I have been in every one of them that amounts to anything."

Our reporter left with the thought that if one-half of Utah's mining men were as sanguine as that man, they might make it lively in our mountains, even though they were not half as successful.—*Salt Lake Tribune*.

Increase of American Production.

The following table, showing the great increase in production in the United States during the last 20 years, has been compiled by the Hon. J. Hay, Assistant Secretary of State for the United States:

TWENTY YEARS' INCREASE IN PRODUCTION IN THE UNITED STATES.			
	1860.	1880.	Increase per cent.
Population.....	31,443,321..	43,500,000..	55
Wheat produced, bbls.....	1,733,104,321..	440,000,000..	154.2
Wheat exported, ".....	4,165,153..	175,000,000..	4,111.8
Maize produced, ".....	838,792,740..	1,450,000,000..	72.9
Maize exported, ".....	3,314,305..	100,000,000..	2,917.3
Wool produced, lbs.....	60,264,912..	232,500,000..	285.8
Cotton produced, bbls.....	4,823,770..	5,075,000..	17.0
Petroleum..... bbls.....	500,000..	19,741,661..	3,843.3
Iron produced, tons.....	919,770..	3,070,875..	234.1
Rails produced, ".....	205,038..	1,113,273..	442.9
Hogs, packed.....	2,350,822..	9,950,451..	195.7
Butter exported, lbs.....	7,640,914..	38,248,016..	400.0
Cheese exported, lbs.....	15,615,799..	141,054,474..	815.5
Merchandise imports.....	\$338,232,485..	\$70,000,000..	89.3
Merchandise exports.....	316,242,423..	\$35,000,000..	164.2
Gold & silver produced.....	46,150,000..	79,711,990..	72.9
Gold & silver exported.....	67,996,104..	.....	.....
Gold & silver imported.....	.....	75,713,531..	.....

CURIOUS FIGURES.—Baron Kolb, a German, who has been ransacking the figures of the universe, says that the English is the most widely spread language, being spoken by about 80,000,000 people; German by 50,000,000 or 60,000,000; French and Spanish, 40,000,000 each; Russian, 55,000,000. Every advance made by a people in morality and healthy employment and useful knowledge adds to its tenure of life. The average of life among the well-to-do is 50 years, among the poor 32 years. Clergymen average the longest lives—66 years. Idlers are shorter-lived than the industrious, and statistics prove that in countries where consanguineous marriages are permitted there are to be found a greater number of deaf mutes and idiots than elsewhere.

THE ENGINEER.

Improving the Upper Mississippi.

The scheme for improving the Mississippi river by means of what is known as the reservoir system, though less talked about than when first advanced, has not been allowed to languish. It has been steadily and persistently pushed, and measures are now fairly under way for giving it a practical test. Col. Platt B. Walker, who has recently visited Washington in the interest of the project, has recently returned to Minneapolis with copies of official charts showing the results of surveys and the details of the proposed improvement. The first dam, for which a congressional appropriation of \$75,000 was obtained, will be built across the Mississippi at its outlet from Lake Winnebago, and its construction will be commenced as soon as an arrangement can be made with the Indians of the Leech Lake reservation, upon whose reserves the contemplated improvements are to be made. This dam will be 1,114 ft. long, 14 ft. high, and will flood the country for 20 miles back, holding sufficient water to effect quite perceptibly the stage of water through the dry season. Of course this is but a small portion of the projected improvements; but a large number of such dams can be constructed, with sufficient capacity to maintain a navigable stage of water, throughout all the region now seriously affected by the drouths of summer.

JAPANESE RAILROADS.—The following is the present state of railways in Japan: A line from Tokio to Yokohama, 18 miles in length, was completed early in 1873, and has not since been extended. Since that time a railway from Higo to Osaka, 22 miles long, and about 230 miles south of Tokio, was built and afterwards extended to Kioto. Still more recently a further extension was made to Otzu, on the south bank of Lake Biwa. These include all the railways in Japan, the length being about 60 miles. Another line has, however, been commenced from Tokio to Mayebashi, more than 60 miles long. This railway, the construction of which offers but few difficulties, will be of great commercial importance. A railway is projected in the northern island, and it is in contemplation to extend the southern system from Kioto to Lake Biwa, and for some distance up the center of the island.

THE ENGLISH CHANNEL TUNNEL.—It is said that within 18 months 2½ miles of the channel tunnel between England and France will have been excavated, and that the work will be completed in four years, probably by boring from each end. There are evidently, however, contingencies, such as a break in the rock, which may destroy the whole enterprise. Meantime another bold scheme for crossing the channel contemplates a line of steel tubes 16 ft. in diameter, ballasted so as to make it weigh one and a quarter tons to a foot less than the water displaced, and beld at the depth of 35 ft. below the surface (so as not to impede navigation) by being anchored by chains or caissons sunk to the bottom. Through this floating tunnel of 20 miles or so it is proposed that railway trains shall pass. The scheme appeals too strongly to credulity.

THE EAST RIVER BRIDGE.—The great East river bridge between New York and Brooklyn is still in course of construction, and much remains to be done. The steel for the roadway which is to be hung from the cables is not yet delivered. The stone work on the approaches is expected to be finished by Dec. 1st; one large building remains to be torn down, the elevated railway station in Chatham street will have to be removed and a bridge must be built over the elevated road at Franklin square. The Brooklyn approaches are also yet to be constructed. The approaches on both sides of the river are expected to be fully completed in about six months, unless the weather is so severe as to retard the mason work. The engineers had hoped to have the bridge open to the public on July 4, 1881, but the delay in getting the structure has disappointed them so that they do not expect to finish it until Sept., 1881.

THE ISTHMIAN SHIP RAILWAY.—Capt. Eads is in earnest about the construction of a ship railway across either the Isthmus of Panama or of Tehuantepec. As to the feasibility of the enterprise he entertains no doubt. To illustrate the sincerity of his convictions, he was to have sailed from New Orleans on the 4th inst., with a party of engineers, who will examine the Isthmus of Tehuantepec, in order to verify the Captain's opinion as to its suitability for the work proposed. It is said, Capt. Eads will, at the same time, endeavor to secure Government sanction for his proposed survey, and to ascertain what the Mexican Congress will be willing to do if he decides to build the railway.

ENGINEERS' CONVENTION.—A very interesting convention of surveyors and engineers, resident in Pennsylvania, is now in session in Harrisburg, the call having been issued by the Engineers' Club of Philadelphia. The topics suggested for discussion by this body were wholly technical, and refer to revision of the laws so as to provide for periodical tests of surveyors instruments, the establishment of standard meridians in each county, a uniform system of fees and compensations to surveyors, a geodetic survey of the State, the creation of a Board of State Engineers, etc.

USEFUL INFORMATION.

Chrome-Tanned Leather.

It is stated by *Engineering* that an important improvement in tanning leather has been brought out in Germany which promises to be of great importance, as it dispenses with the ordinary tanning materials. Dr. Christian Heinzerling, of Frankfurt-on-the-Main, is the inventor. His process involves the use of inorganic chemical compounds only, the special member of which is bichromate of potash. Generally speaking it may be said that the other compounds, all of which are readily soluble in water, have as their function the decomposition of the bichromate of potash, so as to set free its contained chromic acid, which is really the chemical agent that exerts the tanning effect on the tissue forming the corium or lower layer of the animal hide. There are many considerations which seem to justify us in expecting great results from the adoption of the Heinzerling process. One leading fact is, that it requires for its completion a period of only from four to five or six weeks, whereas the bark-tanning process requires from 12 to 20, or occasionally, even 30 months for its completion. It has already been adopted in 14 tanneries in Germany, and is being introduced into Russia, Belgium, France and Italy.

It is claimed that chrome-tanned leather has several properties which render it superior to the bark-tanned, the upper leather being more elastic, tougher, and very enduring. It is closer and finer in the grain than bark-tanned leather, the weight of the two descriptions being equal. It is also said to be much more impervious to water than any other. A prominent citizen of Biedenkopf says: "I have given the leather a trial, and now beg to state my opinion of its quality. I have been able to test them in the heavy snow, through which we have been obliged to walk through the forests, etc., and never had wet or damp feet, as was invariably the case with bark-tanned ox leather and calf leather. I must draw attention to the fact that during the whole time I never used any sort of grease, and to-day the boots are as soft as at the beginning. I then tried, after walking long distances through snow and rain water, putting the boots before the warm stove to dry, and found to my great surprise that the leather did not get hard, as it does in the case of bark-tanned leather. I may just add that I never had a pair of boots that kept out all dampness and were as strong as those made of chrome-tanned leather."

PARAFFINE AS A PROTECTION TO WOOD AND IRON.—A German scientist recommends paraffine as an efficient means of protecting wood against damp, acids and alkalis. The wood is first well dried, and then covered with a solution of one part melted paraffine in six parts petroleum, ether or bisulphide of carbon. The solvents evaporated quickly, leaving the paraffine in the pores of the wood. Great care must be taken in the use of this preparation, as paraffine, as well as petroleum, ether or bisulphide of carbon, is especially inflammable; and even the vapor of the two last mentioned substances, if mixed with air, may give rise to dangerous explosions. Paraffine melted, with equal parts of linseed oil and rapeseed oil, is also very useful to protect iron from rust.

FINE LINEN.—According to the *Building News* a piece of linen has been found at Memphis containing 540 picks to the inch, and it is recorded that one of the Pharaohs sent to the Lydian king, Croesus, a corselet made of linen and wrought with gold, each fine thread of which was composed of 360 smaller threads twisted together! The ancient Egyptians wove a fabric called the "linen of justice," or "justification." So beautiful and valuable was it that it was esteemed the most acceptable offering to the "Restorer of Life." A few hand looms can be seen at work in the Eastern bazaars of Cairo, the cloth woven in which rivals in texture, color and design the finest glass screens of Munich.

CAOUTCHOUC dissolves more or less perfectly according to its condition in various liquids; among which may be mentioned the various fixed and hydro-carbon oils, chloroform, ether and carbon-disulphide. Unless, however, the caoutchouc has been masticated or otherwise degenerated, it is doubtful whether a true solution is obtained. When a clear, limpid solution is required, one of the best solvents is that proposed by Payen, namely, carbon-disulphide, mixed with 5% of absolute alcohol. If one part of masticated caoutchouc is dissolved in 30 parts of the above solvent, a solution is obtained which can be filtered through paper, and may be employed in covering the most delicate mold with layers of caoutchouc.

ODORLESS BENZINE.—Ten gallons benzine mixed with one gallon cottonseed oil, subjected to slow distillation till nine gallons have come over, yields a benzine which evaporates without leaving any smell. The same oil can be used three times, but then seems to become so impregnated with the impurities of the benzine as to lose its effect.

MARINE GLUE is made by melting together one part of unvulcanized caoutchouc, first softened or dissolved in cool naphtha, and two parts of shellac.

HOW CHICKENS GET OUT OF SHELLS.—Take an egg out of a nest on which a hen has had her full time, carefully holding it to the ear; turning it round, you will find the exact spot which the little fellow is picking on the inside of the shell; this he will do until the inside shell is perforated, and then the shell is forced outward as a small seal, leaving a hole. Now, if you will take one of the eggs in this condition from under the hen, remove it to the house or other suitable place, put it in a box or nest, keeping it warm and moist, as near the temperatures of the hen as possible (which may be done by laying it between two bottles of warm water upon some cotton or wool), and lay a glass over the box or nest, then you can sit or stand, as is most convenient, and witness the true *modus operandi*. Now watch the little fellow work his way into the world, and you will be amused and instructed as I have often been. After he has got his opening, he commences a nibbling motion with the point of the upper bill on the outside of the shell, always working to the right (if you have the large end of the egg from you and the hole upward), until he has worked his way almost around, say with one-half of an inch in a perfect circle; he then forces the cap or butt end of the shell off, and then has a chance to straighten his neck, thereby loosening his legs somewhat, and so, by their help, forcing the body from the shell.

DIAMOND CUTTING, formerly monopolized by Amsterdam, is now done so much better in New York, that many of the best Amsterdam cut gems are sent to New York to be recut and returned. The Amsterdam cutters aim to diminish the weight of the diamond as little as possible; the American plan is to cut mathematically, according to recognized laws of light, thus developing to the utmost the brilliancy of the gem. The average increase of value given to diamonds by the New York cutting is \$5,000 for each person employed for 12 months.

A NEW OIL FROM GRAPEVINES.—M. Laliman, a French savant, has discovered that an oil can be distilled from the American vines which will not congeal above 8° Fahr., while other oils congeal at 27½ Fahr. M. Laliman, therefore, recommends this oil for watch-making and similar uses.

VERMIN IN BIRDS.—A lady "who loves birds" writes us that to rid canary birds of vermin, put 10 to 15 drops of carbolic acid into about a quart of warm water, and bathe the bird quickly therein. Scald every portion of the cage and perches and wash with the acid and water.

HORSE LEATHER, it is reported, has been officially adopted as the material of which the boots issued to sailors of the German navy are in future to be made, experiments in the use of this material for the past 18 months having been so satisfactory that calf skin is to be abandoned.

GOOD HEALTH.

The Secret Out.

A very imprudent physician has done his brethren a great injury by thoughtlessly divulging one of the most valuable secrets of the profession. "How is practice now? you must be making a great deal of money, for every third person seems to be ailing?" "True; there is much serious sickness, but I get no practice. The panic has made the times so hard, that people cure themselves by eating nothing."

There are few bodily ailments which are aggravated, and in some cases rendered incurable by insufficient diet; but with the exception of diphtheria and a few others, nine out of ten of all ordinary ailments are controlled, are arrested, are permanently cured by a wise diminution of the amount of food eaten. This is particularly the case when there is no decided ailment, but a general feeling of discomfort or of unwellness. In all actively inflammatory maladies, where there is acute pain any where, total abstinence from all substantial food, from everything liquid or solid, except hot teas, is the sheet-anchor of safety, when not extended beyond 36 hours. No one should venture on a longer abstinence on any occasion without the advice of a physician.

All pain is caused by over-distended blood-vessels pressing against some neighboring nerve. Hence the quickest way of relieving any ordinary pain is to diminish the amount of blood in the vessels of the part by bleeding. But there is a safer, a better and a more enduring relief in cutting off the supply of blood; and as blood is made out of the food we eat, it must be apparent, that if on the feeling of pain or discomfort, we cease eating absolutely, that pain must begin to diminish within six hours, that being the time required for converting food into blood, and if no more food is eaten no more blood can be made, while if the amount in the system is diminished at the rate of two or more pounds in every 24 hours of invalidism, there must soon be relief.

A USEFUL TOOTHWASH.—Moisten the brush on a piece of lime or lemon and rub the teeth and gums well; then rinse with water, which will not only clean the teeth, but improve the breath. If any of our readers consider the above injurious to the teeth, we would like to hear from them.

Coffee Drinking.

How strong should coffee be taken? is an inquiry of much practical importance. How much should be taken at a meal? is scarcely of less moment. Coffee, like any other beverage, may wholly ruin the health; the very use of it tends to this ruin as certainly as does the use of wine, cider, beer or any other unnatural stimulating drink. There is only one safe plan of using coffee, and that is, never, under any circumstances, except of extraordinary character, exceed in quantity, frequency or strength; take only one cup at the regular meal, and of given, unvarying strength. In this way it may be used every day for a lifetime, not only without injury but with greater advantage than an equal amount of cold water, and for the same reason that nothing cold should be drunk at a regular meal, except by persons in vigorous health.

One pound of the bean should make 60 cups of the very best coffee. If a man takes coffee for breakfast only, one pound should last him two months, or six pounds a year.

One pound of coffee should be made to last a family of 10 persons, young and old, one week. Put about two ounces of ground coffee in a quart of water, or rather divide the pound into seven portions, one for each breakfast in the week, and make a quart of coffee out of it, which will be 64 tablespoons. Give the youngest two tablespoonsful and the oldest a dozen; the remainder of the one cup being filled up with boiled milk. This will give a cup of coffee sufficiently strong for all healthful purposes, for the respective ages; and for various reasons, pecuniary as well as physical, some such systematic plan as this should be adopted in every family in the land. How to make a good cup of coffee? is a third question. It is perhaps as good and as easy a plan as any to buy the coffee in the grain, pick out those that are imperfect, wash it, parch as much as will last a day or two, with your eye upon it all the time until it is of a rich brown, with no approach of black about it. Grind enough for the day's use; grind it fine, for the greater the surface exposed to the hot water the more of the essence you will have; pour the boiling water on the coffee, close it up, boil it 10 minutes, let it stand to clear 10 minutes, then use.

There are additional devices for husbanding the aroma, but as people who are so very particular about every thing they eat being done to the nicest shade, are but a shade above the brutes, and generally die 20 years before their time of inanition, of chronic diarrhea, it is not thought important to initiate the readers of this journal any further into the mysteries of coffee-making and drinking.—*Journal of Health.*

EFFECT OF PERFUMERY ON HEALTH.—An Italian professor has made some very agreeable researches, resulting in the discovery that vegetable perfumes exercise a positively healthful influence on the atmosphere, converting its oxygen into ozone and thus increasing its oxidizing influence. The essences found to develop the largest quantity of ozone are those of the cherry, laurel, clover, lavender, mint, juniper, fennel and bergamot; those that give it in smaller quantities are anise, nutmeg and thyme. The flowers of the narcissus, hyacinth, mignonette, heliotrope and lily of the valley develop ozone in closed vessels. Flowers destitute of perfume do not develop it, and those which have slight perfume develop it in small quantities. Reasoning from these facts, the professor recommends the cultivation of flowers in marshy districts, and in all places infested with animal emanations, on account of the powerful oxidizing influences of ozone. The inhabitants of such regions should, he says, surround their houses with beds of the most odorous flowers.—*The Mechanic.*

SUDDEN DEATH.—The chances of escaping sudden death are nearly two to one in favor of women. Death always begins at the head, the heart or the lungs; therefore,

1. Keep the head cool by taking the world easy.
2. Keep the lungs breathing deeply and fully about 17 times a minute, by cultivating alacrity in all the bodily movements.
3. Keep the heart heating about 68 times a minute, that is, let the pulse heat four times while the lungs breathe once, by eating temperately, sleeping fully and soundly, exercising moderately and avoiding all temporary excitants, mental or liquid.

THE TREATMENT OF RATTLESNAKE BITE.—A professional snake catcher of Holyoke, Mass., treats rattlesnake bites as follows: He first ties a cord tightly around the member bitten, so as to cut off the flow of the blood toward the heart. The bleeding wound is then sucked out thoroughly to withdraw as much of the poisoned blood as possible, after which strong spirits of ammonia is applied. After a while the string is loosened a little to allow the remaining poison, if any, to be so slowly absorbed into the system that no serious results are likely to follow.

TROPICAL DISEASES.—The *Journal of the Society of Arts* for February has a paper on the tropical diseases and the proper means of avoiding them. Sojourners will not adapt their food to the new conditions of a warm climate, but "stuff themselves" as before, instead of imitating the natives of the country. Common sense teaches people at home to eat less in summer than in winter; and this rule would be the proper one for the tropics. The author recommends diet and moderate exercise, instead of feeding and resting and taking quinine.



W. B. EWER,.....SANIOR EDITOR.

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G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 6, 1880.

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Business Announcements.

Dodge's Unequalled Concentrating Machinery.
Gold Quartz Mine for Sale.
Dividend Notice—Standard Consolidated Mining Co.

The Week.

The mining news this week, though abundant enough, does not indicate any new features in the situation. On the Comstock no bonanzas have been struck, and there are no special indications of any near at hand. As a consequence the share market keeps dull, as it has been for a long time.

The all-important and overshadowing event of the week has been the Presidential election, and it is highly probable that everybody, including the candidates, is heartily glad the botchy contested campaign is over.

So far no indications of rain have shown themselves, but the hydraulic miners are pretty generally prepared for it. The quartz miners, in the more elevated and colder districts, have already provided themselves for the winter. In these latitudes pleasant warm weather has been the rule for a week or so.

Now that election is over, we hope those who have had their attention occupied by the campaign, and who are interested in mining, will return with renewed vigor to the development of their properties, so that California will continue to hold her second place in the list of bullion producers.

No official report has yet been made of the receipts of the late Mechanics' Institute fair, but we are informed unofficially that about \$14,000 will be cleared over and above all expenses.

The Empire mine at Grass Valley, which was abandoned a few years ago, is being pumped out. The water has already been lowered to the 800 level, and will be still further lowered to the 1200 level.

The *Santa Independent* says that to satisfy a number of judgments, the Eureka mine, Como, will be sold at public auction on Saturday, November 13th. San Francisco parties are expected to make the purchase.

Local Manufactures.

We hope from this on to see California take a better position as a manufacturing center than she has hitherto done. Rates of interest have materially lessened, the country is more thickly populated, means of transportation have increased and improved, and the State has "waked up" generally. It takes time to develop an industry of any magnitude, and it also takes a good deal of money and energy to start it. But we have the energy and the money, and now is the time. There are a good many small towns throughout the State where no particular impulse has been given to any branch of business that can be widely developed, and in any one of these places, if a start were made and a manufactory established, it would not be long before that establishment would make a name for itself if managed properly.

It has been noticed that when a certain kind of manufacturing industry has started up in a small town or new settlement, it finally becomes the prominent industry of the town. Hundreds of Eastern and European towns indicate this. Some are famous for iron work, some for cars, some for clocks, knives and forks, toys, brass goods, firearms, etc. We haven't any of these places in this State, yet they are the localities which make other communities prosperous.

Most of the manufacturing industries of the State of any magnitude are concentrated in San Francisco. The small towns have been left out in the cold, and have to depend on the agricultural or mining communities near them for support; and, unfortunately, the result has been that very few of the interior towns are in as prosperous a condition as they should be.

Manufacturing establishments of any character must first acquire a local reputation, and this will in time spread as their business increases. San Francisco is now mainly noted, from a manufacturing point of view, for its mining machinery and its woolen goods. The woolen mills have sent their products all over the coast. The foundries, from small beginnings, have multiplied in number and in usefulness, and have for some years manufactured mining machinery, not only for the Pacific Coast States and Territories, but for Mexico, Japan and South America. California has set the pattern for mining machinery of all kinds, making it hotter and cheaper than elsewhere.

Of course, there are many other branches of manufacture in this great city, which are prosperous and flourishing, and which are gradually becoming better known. The plea we are making now is for similar works to be started in the interior towns. Low rents, cheap living and convenient facilities may be had in many places. Any of these communities will give any assistance in their power. Let the new industries grow up with the country, starting in some small town, and developing gradually with its growth a class of population who shall be producers in a branch requiring skill, mechanical knowledge and ingenuity. Nothing will make us more prosperous than this. Agriculture and mining are very well in their way, but we must educate mechanics and artisans, or it will take all the miners and farmers make to pay for appliances and materials which they need.

TIN MINES IN MAINE.—Referring to our recent article on tin mining in Maine, says the *Scientific American*, a correspondent in that State writes that the promise of the mine at Winslow continues to be most encouraging, indeed far better than that offered by the best Cornwall mine at an equal depth from the surface. He adds that "with every day's work the seams are widening and rapidly converging toward what must at no great depth prove a champion vein of large dimensions." Our correspondent is of the opinion, however, that the western portions of the State give indications of more valuable deposits of tin. In this region are extensive belts of gneissoid ledges interspersed with fluor spar, and in several places in Cumberland county fine specimens of cassiterite have been taken from what appear to be well defined seams. Some of these seams were laid open in rock cuttings for railways some years ago, but those who did the blasting knew nothing of mineral ores, and the geologists were looking for other things.

NEW CONCENTRATING MACHINERY.—Mr. Miles B. Dodge, of this city, who has an improved concentrator of his own invention at work at No. 143 Fremont St., has been doing some very good work with his machine lately. He recently concentrated 1,690 pounds of gold quartz from the Last Chance mine, Mariposa county, down to about seven and one-half lbs., and out of this obtained \$84.78 in gold. This same ore only worked \$20 per ton in the mill; but after being concentrated and properly worked the result was very satisfactory. Mr. Dodge says he is prepared to demonstrate to those who will send their ores to him, that he can obtain with his concentrator from 25% to 100% more than any other machinery now in use.

The troublesome bar which has formed at the mouth of Feather river—known as the Fremont Bar—has been considerably improved by the building of over 1,000 ft. of wingdam at that place, under the supervision of Colonel Mendell.

Loss of Life in Mines.

We have not, in this country, any government mining commission, or any official organization of any kind for collecting statistics connected with mining. The office of U. S. Mining Commissioner was abolished some time since, and to the Director of the Mint was left the duty of collecting statistics of production of the precious metals. The U. S. Geological Survey, as at present organized, is engaged in collecting information concerning mines, but it exercises no supervising functions whatever. Any kind of machinery can be used—good or bad; and any plans carried out without danger of hindrance from either Government or State officials. There is no means, therefore, of our getting at the proportionate loss of life to the number of men employed, or to the product of the mines. We do not know whether it is greater here than in Europe, or whether the accidents which cause loss of life are greater in one class of mines than in another.

In Europe, statistics of this character are carefully kept, with a view to lessen, if possible, each year the loss of life by investigating the causes and providing remedies. Comparisons between the systems in vogue in different districts and different countries can thus be made, and the best one adopted.

At a recent meeting of the North Staffordshire Mining Institute, in England, Mr. R. A. Sawyer gave a comparison of the proportion of lives lost to the number of persons employed, and to the output in Great Britain and Ireland, and Prussia. In 1878, in Great Britain, there were 103,183 tons of mineral raised per life lost, and for every life lost there were 336 persons engaged. In Prussia, there were 401 persons employed and 95,868 tons raised for every life lost. But 1878 was an exceptionally fatal year in England, owing to two large explosions, which together caused the death of about 450 persons. Taking previous years, it was found that England was far in advance of Prussia respecting the proportion of lives lost to the number of persons employed. Thus, in 1877, there were 409 persons employed in Great Britain and 407 in Prussia for every life lost; in 1876, 551 to 378; in 1875, 430 to 333; in 1874, 510 in Great Britain to 377 in Prussia. How was it that, notwithstanding the technical education possessed by all in authority in Prussia, the comparatively small depth of many of its mines, and its stringent mining laws, how was it that the death rate was so much smaller in Great Britain than in Prussia? He believed it was the result of the English Coal Mines Regulation Act and the most practical system of inspection for which it provided. In Prussia the system of inspection was bad.

In this country we haven't any system of inspection at all. If the hoisting works' cable breaks and drops a dozen or so men down a shaft, their families have a chance to sue the company, and if the company have anything and the jury thinks proper, the heirs get damages. Oftener they don't, however, and the whole thing "blows over." Our investigations of these disasters seldom amount to much, and any attempt to provide against them is left wholly to the mine managers, no Government or State officials having any authority to call attention to deficiencies or enforce any regulations which shall protect life. As before stated, we can make no comparisons with systems of mining in other countries, as affecting loss of life, simply for the reason that we have no full statistics here upon which to base a comparison.

A few weeks ago an old prospector named Alexander Swift, who had gone into the Skagit mines to seek for gold, was found by miners wandering in an almost famished state among the mountains of that inhospitable region. He had been out for 29 days, and was taken into camp, fed, clothed and started on the way toward the town of Fort Hope, on the Frazer river. He never reached that place. News has been received that the body of the lonely old man had been found near the boundary line between the United States and the British territory, wrapped in its blankets and bearing evidence of having been dead many days. The discovery was made by an Indian. Swift has many friends in San Francisco, who will be saddened to hear of his miserable end.

The North Bloomfield gravel mining company has declared a dividend of \$1 per share, payable on the 5th. This is the 16th dividend, and aggregates \$45,000. The previous 15 dividends aggregated \$180,000. It took a long time to accomplish this, however, a great many successive assessments having been paid before the mine was put on a paying basis. The North Bloomfield is one of our representative hydraulic mines.

The steamer *Princess Louise*, from Fort Wrangel, brought 150 passengers to Victoria from the Cassiar mines. She experienced a hurricane on her voyage down and came very near being lost.

The deposits of bullion for coinage at the San Francisco mint for October were: Gold, 123,822 ounces; silver, 990,525 ounces.

New Water Supply for the City of Oakland.

(Written for the Press by A. V. D. N.)

Near the summit of the Coast Range dividing Alameda and Contra Costa counties, six or seven miles north of the city of Oakland on the Morago Valley road, is situated the property known as the Luch's ranch. On this ranch and near the road above named, a tunnel was started in the side hill, about four years ago, with the purpose of prospecting for coal. After more than two years of persevering and unremunerative labor, for no coal was found, and an expenditure of many thousands of dollars, the company was about to withdraw from the field when a last attempt was decided upon, and a winze ordered to be sunk from the extremity of the tunnel. After a few days' work, instead of striking coal, the astonished miners met with a stream of water so powerful, that they had to flee for their very lives; and planks, timbers, wheelbarrows, picks and shovels were washed out of the tunnel with a frightful velocity. The company, being apprised of the fact, went out to see the phenomenon. After having tasted the water, ascertained its quality by analysis and determined by further investigation that the extent of the underground water basin was of considerable magnitude, the idea of supplying the city of Oakland with pure water originated with the owners of the tunnel. They at once sent for Mr. John Graham, an expert in water works, to have his opinion about the feasibility of supplying the city of Oakland with pure water from the tunnel. Mr. Graham was formerly the superintendent of the Temescal reservoir. This reservoir with its enormous dam was built by Mr. Graham, who also laid the distribution mains clear into Oakland. This Temescal water system, a part of the Chabot water supply, having proved a success in every particular, and no accident whatever having happened during the construction of the works, the tunnel company thought that Mr. Graham would be the proper person to take charge of its works, if it was deemed advisable and profitable to erect them. Mr. Graham, moreover, had built successfully a whole system of water works near Edinburgh, in Scotland, at a place named Dunbar, and also has erected water works for the village of Worcester in New York State, this country. Mr. Graham, after considerable investigation of the tunnel water supply, and of the water shed between the summits, which is over 10,000 acres, with many beautiful springs oozing from the hillsides, concluded that water enough could be accumulated there to supply the city of Oakland with its future extensions for 40 years to come. Mr. Graham, after mature reflection, proposed a double system of supply, which is at present under way of being carried out. The magnificent water coming from the underground basin in the tunnel, so delightful in its quality and coolness, would be carried to Oakland in a separate system of mains to be used for drinking and culinary purposes only. The water derived from the springs in the hillsides, and from the rain shed (the lands here are all rock and gravel) although of as pure a quality as those of the San Francisco Spring Valley, would be carried in separate mains to Oakland to serve for laundry purposes, washing carriages and irrigation, and also for the extinguishing of fires occurring in the city. These last waters would be kept in a gigantic reservoir, formed by a dam 150 ft. high, erected at a place in the canyon 725 ft. above the grade of Oakland. As the waters of this reservoir would be conducted directly to the city in a 16-inch main pipe, it is expected that the pressure would be such as to need no fire engines in case of fire to throw the water on to the highest building possible. This, it is expected, would be a great saving to the city, and this alone would be a feature to commend it highly to the favor of the inhabitants of Oakland. Mr. Graham has commenced the construction of the work in earnest and has been actively at work building a cement and brick-work reservoir to receive the pure waters from the tunnel as they flow out of it. This reservoir, or kind of filtering basin, is intended to catch any gravel or small stones that might be kept in suspension through the velocity of the tunnel waters. These on leaving the basin will be carried through a 12 inch pipe into a reservoir built of masonry and cement, situated near the Deaf and Dumb Asylum, opposite Judge Garber's place. This reservoir is 430 ft. above the level of the city of Oakland, is 150 ft. in diameter, 60 ft. deep and at a distance of four miles from Oakland. The grading for a line of pipes leading from the filtering basin to the reservoir is being dug along the sidehills, and will soon be ready for the laying of the pipes. Soon after this work is performed, and while laying the pipes to conduct the tunnel water to Oakland, the erection of the immense dam across the canyon will be commenced. We expect at some future day to publish in this paper, illustrated with plans and profiles, the whole scheme of the Summit water works to serve as instruction to the interior towns who have not the good fortune of having at hand such a practical man as Mr. John Graham.

The California and Ophir mines have made a connection between the 2000 and 2300 levels.

The Scenery of the Columbia River.

There will soon be published by the Continent Stereoscopic Co., of New York, an illustrated tour descriptive of the upper Pacific coast, entitled "Picturesque Northwest," by E. Conklin, of the Frank Leslie publishing house. It is pronounced by a New York critic, who has seen the advance sheets, to be "a superb volume." By the courtesy of the author we are enabled to give our readers a glimpse at a few scenes which the book will present, choosing for this page La Tourelle falls on the Columbia river, and in connection therewith we shall quote from an advance sheet the authors' comments upon these falls and the scenery leading thereto. "The Columbia river drains over 400,000 superficial square miles in its course. It rises in the Rocky mountains, in British America, just north of the United States line. It takes a due southerly course and holds this general course south, traversing the eastern half of Washington Territory until it reaches Oregon. It then turns directly westward, forming the boundary line between Washington Territory on the north and Oregon on the south. Near the point where it first touches Oregon, it connects with the Snake river from the east. The Snake, a large and navigable stream, rises far to the south in Idaho, comes north to a point a short distance north of the northern boundary of Oregon, and then turns east to join its waters with the Columbia in its grand march to the sea. A sail up the river is a continuous revelation of nature's most charming diversions of foliage, hill-creeping forests; loyal, verdant plains, stretching back on each side of you, and little heads and islands which lend the finishing enchantment to the whole.

"At the end of 125 miles, having passed the mouth of the Willamette river, you enter the region of the great cascades of the Columbia, and what is known as the 'Cascade Route.' This is a section which justly claims a place among the natural wonders and phenomena of the United States, and what is laid openly and boldly before you, on each side of the river, warrants this assertion. Being comparatively unexplored, little is known of this section but what is conspicuously laid open to the sight in the trip on the river; but the sturdy pioneer, in search of agricultural pursuits has, even at this present writing, found ample to award him, and settlements can now be seen in many cases, occupying the very brink of the river.

"The Cascade trip comprises a distance of 60 miles; and the upper portion—or the last five miles—is the portion where the waters of the mighty Columbia forces its way through the Cascade mountains. Roaring and surging, with immense walls and mountains, 3,500 ft. high, on either side, to assert that this is one of America's premium sights, and makes the traveler feel there is yet more in this country of ours than was ever dreamed of. Huge mountains from 1,000 to 3,500 ft. high fret the surrounding country to the very water's edge and ever find their way beneath this current in such promiscuous and ponderous masses as to throw the boats out of recognition of their courses.

"One of the first points of interest is that known as Cape Horn, a peculiar formation of concrete and sandstone rock rising perpendicularly from the water's edge to a height of 250 ft., and extending along the river for one-half a mile. The formation resembles large posts, pillars and cones cemented together to form some immense wall or barricade. The river boats, in their passage, run within stone's throw of it, and one gets his first sense of inspiration of the region he is now passing through. Following for a distance of eight miles is a region where the nymphs seem to have resorted; in their greatest ecstasy, to fulfill the delights of their wanton spirits. It would be hard to say how many water-falls there are in this limit. The La Tourelle fall is one of the grandest on the river, and to those who will stop at the La Tourelle Mountain House, and visit the fall, there will be at least one lasting reminiscence of a successful tourist. The falls are about 400 ft. high. Coming from an overhanging wall projecting from the land a distance of about 50 ft., the water is thrown in rain-how style, far out from the main land; and coming through mid air with great force, dashes itself to pieces in a basin carved from the rocks by its own power, and ornamented with wild flowers and vines in gorgeous profusion. Behind the falls there is a distance to the main land of about 80 ft. This is ample room for a drive-way between the fall and the back wall. You look out upon a broad open vacuum and up to a spotless azure sky; and between you and infinity there comes dashing down, in appearance, one colossal water column from heaven."

THE Tombstone Epitaph of Saturday says: "The first shipment of silver bullion from the Boston and Arizona reduction company's mill was made on the 28th, consisting of six bars—627 lbs.—valued at \$918,610. This bullion is the product of the experimental run, and the results are most satisfactory throughout. The Boston mill has another contract with the Vixina company for 1,000 tons of ore."

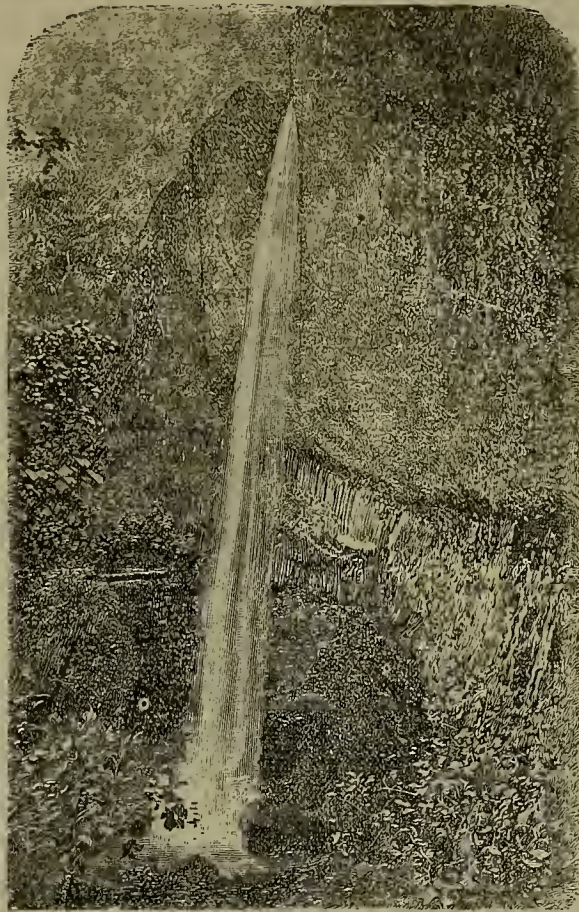
A BAR of mixed bullion recently taken to Nevada City was over half lead, washed out by the hydraulic mines at the old town of Mores Flat.

A Southern Coast Harbor.

Between 30 and 40 years ago, when the commercial interests of California were entirely confined to the shipment of hides, there were four harbors which were used by the hide droghers, and these were the only practicable places of any moment where vessels could load. They were San Francisco, Monterey, San Pedro and San Diego. Those who have read Dana's well known "Two Years Before the Mast" can recall the difficulties experienced in loading the hides, especially at San Pedro, or Wilmington, as it is now called, the sea port of Los Angeles. Both San Diego and San Francisco were natural harbors, secure in any wind; but at San Pedro the vessel had to anchor in an open roadstead, a mile or more from shore, and exposed in the winter to the furious southeasters and south-westerly winds which prevail in the winter months on this coast. The old *Pilgrim*, like many another vessel, had a narrow escape from laying her bones on Deadman's island, and they all had to have good ground tackle to ride out a blow in that roadstead. These same harbors are still the principal ones in California. Monterey is

an open roadstead. Cost of lighterage has been done away with, and, as has been stated, vessels now load grain there for foreign ports. This is a result which we are glad to note. The people of this section need not send their grain all the way to San Francisco first and then ship it to Europe. It goes to Europe direct now. We should be well pleased to see other shipping points along the coast where products could be shipped, but unfortunately California is rather barren of good harbors.

MINING COMPANY BALANCES.—The following companies had a balance on hand November 1st: Con. Virginia, \$15,570.59 in cash and \$79,849.91 (assay value) in unsold bullion; California, \$23,771.22 in cash and \$142,117.01 (assay value) in unsold bullion; Maxioan, cash, \$43,511.19; Opbir, \$2,284.92; Northern Belle, \$165,802.75 (October expenses unpaid); Standard Con., \$165,679.87 (October expenses unpaid); Sierra Nevada, cash, \$13,222.65; North Bonanza, \$11,356.47; Potosi, \$31,599.38; Con. Imperial, \$9,134.22; Chollar, \$10,085.04; Silver Hill, \$10,019.02; Challenge, \$6,530.69; Gould & Curry, \$32,809.96; Occidental, \$12,913.87; Alta, \$30,000; Bismarck, \$2,001.05; Flowery, \$322.44; Deliance, \$318.22; Navajo, \$172.54; North Belle Isle, \$8,316.72; Belle Isle, \$650.97; Independence, \$6,125.76; Argenta, \$990.88; Tioga,



LA TOURELLE FALLS ON THE COLUMBIA RIVER.

visited mainly by steamers, and while good enough in winter, is poor in summer. It is, however, practically a roadstead.

But the dangers and difficulties of the San Pedro anchorage are of the past, for this week we read that the British ship *Eskdale* sailed a day or so ago with 2,000 tons of wheat for Liverpool; and that the British brig *Orient*, which brought coal to Wilmington from England, has begun to load with wheat for Europe. Both discharged and loaded their cargoes inside the harbor at Wilmington.

This result has been entirely due to the government works at San Pedro, where nearly half a million dollars has been spent in building breakwaters to form the harbor. Before the artificial harbor was formed, all the vessels were loaded and discharged by means of lighters, and were, in the winter season, always in danger lying in the open roadstead.

A breakwater some 6,700 ft. long extends from Rattlesnake island to Deadman's island. This wall has been made partly of wood and partly of stone. On the inner side and parallel with it is another wall, intended to direct the current. Between these walls the shallow pontoons, reef and har have been dredged, so that our vessels can carry 15 to 20 ft. of water for about a mile from the entrance. Small vessels go all the way up. In spring tides 12 to 13 ft. of water may be carried all the way up to the wharves.

The improvement of this harbor was accomplished under the supervision of Col. Geo. H. Mendell, of the United States Corps of Engineers. The work was skillfully and economically carried out, and has accomplished more than was expected of it. As an engineering work, it has been an ensured success, and it has exercised a very marked influence on the commercial interests of the southern country. A good harbor has been made where before was

\$12,585.01; Summit, \$7,886.98; Bechtel, \$6,515.58; Booker, \$3,488.69; Double Standard, \$4,825.71; Bodie Con., \$11,552.98; Richer, \$446.25. The following companies had an overdraft at the bank or other indebtedness on November 1st: Union Con., \$15,242.25; Hale & Norcross, \$35,718.36; Lady Washington, \$10,557; Benton Con., \$15,818; Utah, \$4,161.35; Exchequer, \$18,720; Metallic, \$5,748.39; Best & Belcher, \$5,339.68; Equator, \$4,716.39; McClinion, \$277.63; Mono, \$487.73; Alpha, \$13,522.23; Bulwer Con., \$17,052.01; and Grand Prize, \$1,454.61.

IMPORTANT LAND DECISION.—On the 28th of October, the Acting Commissioner of the General Land Office rendered an important decision, in which he sustains the action of the Marysville (Cal.) Register and Receiver, in the matter of the application of Asa C. Ford, to enter under the law of June 15, 1880, the land embraced in his homestead entry of December, 1879, during the pendency of a contest of Thomas Gorham for cancellation of said entry, on the ground of abandonment. The Acting Commissioner, in rendering this decision, announces the following important construction of the two apparently conflicting laws for the relief of homestead settlers, which were enacted at the last session of Congress. He rules that when a person had commenced proceedings for cancellation of a homestead entry, in order to avail himself of the privileges and rights secured by Sec. 2 of the act of May 14, 1880, he has acquired such an adverse standing and interest as will prevent the contestee from making payment under the act of June 15, 1880, for the land embraced in the homestead; or, in other words, that the right of entry conferred by the last mentioned act is confined to cases wherein the United States and the applicant to purchase are the only parties interested.

New Dredging Machinery.

We have had a pretty good experience here in California with dredging machinery. Our tule land experiments have called for exceptionally good dredgers. We have left beaten tracks and experimented a good deal one way or another, not always with success; in fact, the proportion of failures has been great, and the old style of "bucket" and "clam shell" still hold their own, notwithstanding the many rivals which have come forward. In addition to those built for work around the tule lands, others have been constructed with special reference to mining work, and intended to bring up dirt and gold from river bottoms. All of these have been failures without exception.

The latest thing in the dredger line is a new steam dredger and levee builder, which is lying in the Channel St. waters, at the southern end of the city. It is said to have a greater dredging capacity than any machine of the kind ever before constructed. It was built by the Golden State Miners' Iron Works for General Thos. S. Williams, and is to be used to cut a canal through Grand Island, 12 miles long and 25 ft. deep, to carry off the surplus water of the Sacramento river. The earth raised will be thrown on the banks each side of the canal, and will form the levee. Seen at a distance, it looks like a grain elevator, and consists of a large scow, 100 ft. long by 80 ft. wide, upon which the massive machinery and lumber are placed. The dredging apparatus consists of a heavy ladder projecting over one end of the scow, around which revolves an endless chain, to which is attached 35 scoops that will hold 16 cubic ft., or about a ton of mud each. When worked to its utmost capacity, it will dredge 4,000 yards in 10 hours. The ladder will go down to a depth of 25 ft. and raise the mud to a height of 40 ft., from whence it is dumped into a large iron hopper. Attached to this hopper is a new invention for throwing the earth on the banks. It consists of an iron pipe 36 inches in diameter and 100 ft. long, attached to the hopper by a turn-table which permits the dredger to swing from side to side when at work, while the pipe remains stationary. The mud from the buckets is dumped into the hopper and, after a fall of 12 ft. is shot through the iron pipe at a rate of 1,500 ft. a minute, on the banks. The machinery is run by two 100-horse power engines, and the machinery, helting and running gear is on an immense scale. When at work a "spud" pile is let down through the scow and around which it swings as the ladder changes its position. When completed the dredge will have cost about \$40,000.

The Mining Laws.

We receive frequent applications for information concerning the requirements of the law as to work on mining claims—that is, the date when such work must be done. We have several times answered these questions, and now reproduce the amendments to the law passed in January last. We advise our mining friends to cut this out and place it where it can be seen for reference:

An act to amend sections 2324 and 2325 of the Revised Statutes of the United States concerning mineral lands.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that section 2325 of the Revised Statutes of the United States be amended by adding thereto the following words: "Provided, That where the claimant for a patent is not a resident of or within the land district wherein the vein, lode, ledge or deposit sought to be patented is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her or its authorized agent, where said agent is conversant with the facts sought to be established by said affidavits. And provided, That this section shall apply to all applications now pending for patents to mineral lands."

Sec. 2. That section 2324 of the Revised Statutes of the United States be amended by adding the following words: "Provided, That the period within which the work required to be done annually on all unpatented mineral claims shall commence on the 1st day of January succeeding the date of location of such claim, and this section shall apply to all claims located since the 10th day of May, A. D. 1872."

Approved Jan. 22, 1880.

C. H. SWAIN will soon institute suit against the Silver King mining company to recover \$300,000 damages for an alleged breach of contract. The Silver King folks made a contract with Mr. Swain whereby he purchased all their tailings. When it appeared that Mr. Swain was working the tailings at a big profit, it is stated that the Silver King management broke the contract. The suit promises to cause a big sensation in mining circles.

THE Bodie and Mono companies have purchased the Lady Washington pumping machinery, which will be removed from the mine of that company on the Comstock to the new joint Lent shaft of the Bodie and Mono at once.

EX-GOVERNOR H. G. BLASDEL has sold one-half of the Prospectus mine, Bodie, to Seth and Dan Cook. The latter have taken possession of the property.

New Way of Gravel Mining.

Just across Feather river, and almost opposite the town of Oroville, is the Oroville Mining and Irrigating Co.'s claims, one of the most valuable in the State. O. P. Powers, the principal owner, has the management of it. A few hundred yards below where he has worked for several years past, is a flat piece of ground that in summer is but little above the level of the river, and in winter, when the river is high, is entirely covered with water. The bluff near by is soon to be worked, which will cover the flat above referred to with tailings and other debris. But how to work the flat was the question with Mr. Powers. There was no fall, and of course no place to dump the tailings. He has been for the last month working in this way. He has made a flume and laid it on top of the ground, commencing at the river and running back, say 400 ft. The last piece of the flume is 48 ft. long and connected with the next box in such a way as will admit of its being raised or lowered, and stands at an angle of about 45°. A bead of water of 100 inches, with 200 ft. pressure, was being used. The nozzle of the pipe entered the head of the flume about one ft. The bead of the box was otherwise closed tightly, and covered on top about one ft. The balance was open, the same as any other flume box. Where this piece of the incline flume connected with the next box was covered on the top to prevent water, gravel and stones from going over, they would thump up against the top, fall down and be carried off.

This is the whole process. Shovel the earth into this open flume, set up at an angle of 45°, turn on the water and it will go up the flume like a shot out of a gun, bump up against the top after going through the first joint of flume, fall into the second box to be carried off the same as in any other flume. While watching the four men engaged shoveling the earth into the flume, Mr. Powers tumbled a 60 or 70 lb. rock in, which was carried up the incline with ease into the flume beyond. They have been at work only one month, and burrowed a large hole in the earth, into which Mr. Powers has placed a chief and turned on the water, loosening gravel by the carload, which flows into this slanting flume and is driven up into the level box. As they are near the river, and below its surface, from 75 to 100 inches of seepage water is constantly coming into the works, but does no damage; it soon runs into the slanting box, and it, too, is driven up the 48 ft. of incline into the almost level flume beyond.

We desire to state here that this slanting flume box, 48 ft. long, is lined on the bottom and sides, inside, with wooden blocks, the same as those usually found at the bottom of flumes, so that the space inside of this flume was one ft. wide, by something over two ft. in depth. It is a simple contrivance for mining level ground, where a bead of water for driving purposes can be obtained. Any man who ever made a flume box, can make one, and that, too, at a cost of less than \$100, including the blocks to line it. It is one of the simplest things on earth, and ought to have been found out years ago. It has been in operation over a month, and been examined by mine owners in this and adjoining counties, who pronounce it a complete success. No part of it wears out faster than the ordinary flume, except at the upper end where the rock and gravel bump against the covering, which wears out very fast. Should timber be used for covering instead of boards, it would last a longer time.—*Oroville Mercury.*

EXECUTING CRIMINALS BY ELECTRICITY.—The adoption of electricity as a mode of capital punishment has, says *Iron*, enthusiastic advocates in Germany, as well as in France, as witness the following imposing description of a method proposed by a German writer: "In a dark room, draped with black, and which is lighted only by a single torch—the chamber of execution—there shall stand an iron image of Justice with her scales and sword. Stern Justice is popularly supposed to have no bowels; but this German goddess will carry a powerful electric battery in her inside; and this battery will be connected with an arm-chair—the seat of death. In front of the chair shall stand the Judge's tribunal, and only the Judge, jury and other officers shall be present with the criminal during the ceremony of the execution. This will consist in the Judge reading the story of the crime committed by the prisoner, who will be rigidly manacled to the aforesaid arm-chair, and when this is done, the Judge will break his rod of office and toss it into one of the scale pans of Justice, at the same time extinguishing the solitary torch. The descent of the pan will complete the electric circuit and shock the victim into the next world."

RICH GOLD QUARTZ.—We mentioned last week, says the *Auburn Herald*, of Oct. 23d, that the Conrad mine was turning out rock that fairly glittered with gold. This week, we understand from those who have seen it, they are taking out gold that has a little quartz among it. It is said really that some of the pieces taken out are fully half gold. Another party tells us that no less than \$1,500 was taken out in two tubfuls last Monday.

INDIANS HAVE KILLED IN FOUR MONTHS 260 PERSONS in Grant county, New Mexico, so far as known. The people are holding public meetings to urge more active measures upon the Government and to denounce the course hitherto pursued.

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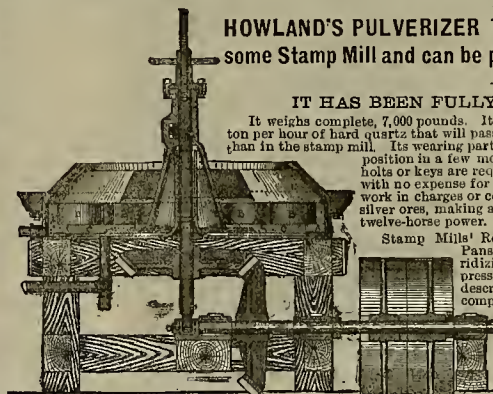
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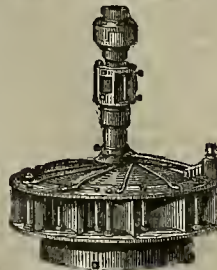
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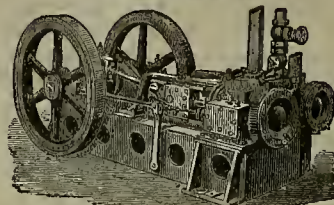
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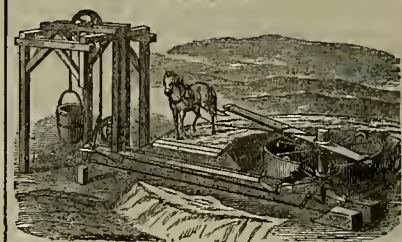
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.

FOR WEEK ENDING OCTOBER 23rd, 1880.

233,658.—GATE.—J. M. Cheney, Sonoma, Cal.
233,692.—WATER WHEEL.—L. A. Pelton, Camptonville, Cal.
233,698.—TAP AND FAUCET.—P. F. Gardner, Hills Ferry, Cal.
233,697.—COAL HOD.—W. S. Ray, S. F.
233,647.—STURRUP.—H. E. Woelke, San Jose, Cal.
233,740.—BURN AND FAUCET.—F. Engleken, Brooklyn, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

WATER WHEEL.—L. A. Pelton, Camptonville, Yuba county, Cal. Patented Oct. 26, 1880. No. 233,692. This device relates to certain improvements in that class of water-wheels known as "hurdy gurdy" wheels, which are driven by the momentum of a stream of water delivered into buckets, on the periphery of the wheel, through a nozzle and under a high pressure. When the water is delivered upon flat or flat-bottomed buckets in this class of wheels, it splashes and reacts against the bottoms of the succeeding buckets, thus retarding the wheel. Buckets having pointed and other shaped bottoms, have been used to overcome the difficulty named, and with some success. In this invention a wheel is constructed having a flat face, and upon this face peculiar-shaped buckets are secured which are adapted to receive the stream from the nozzle and divide it so that the two parts of the stream are directed into the curved bottoms of the two halves of the bucket, and by means of the inclined or flaring sides the two streams are caused to react and escape smoothly at each side, so that the whole reactionary force of the water is utilized, and the water is discharged clear of the wheel and the following bucket.

COAL HOD.—W. M. S. Ray, No. 12 Market street, San Francisco, Patented Oct. 26, 1880. No. 233,697. In the shipping of light, bulky articles considerable cost for freight is entailed by reason of the space occupied, and coal-hods with their flaring bottoms and the projecting side-handle could not be economically packed. If they are shipped in the knock-down or incomplete form, they cannot be japanned or finished; would be spoiled in putting the hod together. This invention is intended to remedy this, and enable coal-hods to be packed or nested so that a dozen complete hods may be packed in a space not larger than would ordinarily be occupied by two hods, by forming the projecting parts separately, and providing means for uniting them without the aid of skilled labor after they arrived at their destination.

FARM GATE.—John M. Cheney, Sonoma, Cal. Patented, Oct. 26, 1880. No. 233,658. This invention relates to certain improvements in that class of farm gates which are constructed in such a manner that they may be opened and closed without the need of the driver of a team leaving his wagon to move the gate. The improvements consist in a peculiar combination of cords or chains and rollers applied to a gate, suspended on rollers and moving in a horizontal plane, said cords and rollers being adapted to be moved by crank from either side of the gate, whereby the gate is readily and smoothly opened and closed.

TAP AND FAUCET.—P. F. Gardner, Hill's Ferry, Stanislaus county, Cal. Patented Oct. 26, 1880. No. 233,668. The object of this invention is to provide a plug or tap which will stop the cask or vessel when drawn forward, and which may be moved back by the action of screwing the faucet in so as to open a communication between the interior of the cask and the faucet, while the said tap is at the same time guided in its movement and prevented, when forced in, from dropping into the cask and avoid the necessity of opening the cask, after the liquid has been withdrawn, to recover it.

The pending sale of the San Jacinto tin mine, San Bernardino county, Cal., has fallen through. The purchase price was to have been \$1,500,000. The purchasing company put up a forfeit of \$75,000 and sent an expert out to this coast, whose report was satisfactory, but the New York company failed, and their creditors have attached the \$75,000 which had been paid over.

At the Receiver's sale, recently, the Bullychoop and Occidental quartz mining property, Trinity county, was sold to James Johnson, of Indian creek, for the sum of \$5,200.

Diamonds in India.

In the "Journal of the Scientific Proceedings of the Royal Dublin Society," Mr. V. Ball, of the Geological Survey of India, gives an account of the mode of occurrence of diamonds in India and of their distribution, and adds references to the most important authorities on the subject. There are in India three extensive tracts, widely separated from one another, in which the diamond has been sought for. The most southern of these has long borne a familiar name, which is, however, to a certain extent a misnomer. There are no diamond mines in Golconda. This name, originally applied to a capital town, now represented by a deserted fort in the neighborhood of Hyderabad, seems to have been used for a whole kingdom; but the town itself was many miles distant from the nearest of the diamond mines, and it was only the mart where the precious stones were bought and sold. The second great tract occupies an immense area between the Mahanada and the Godavary rivers; and the third great tract is situated in Bundelkund, near the capital of which (Punna) some of the principal mines are to be found. The work of the Geological Survey has demonstrated that the diamonds occur in the Vindhyan rocks of northern India. In the upper division of this formation there is a group of clay slate (Kewah), and in the lower a group of sandstones (Semri), in both of which diamond-bearing beds are met with. It is still very doubtful, however, if a diamond has yet been found in India in its original matrix. Mr. Ball gives an account of the chief mines, describing in detail, from personal observations, that of Sambalpur, which has now for some time ceased to be productive. The Punna mines are still productive, yielding a mean annual produce of between \$40,000 and \$60,000 a year. Europeans have attempted diamond mining in each of these three tracts, but in no one instance have their operations been attended with success, and yet there does not appear to be the least ground for supposing that there has been any real exhaustion of the localities where mining is possible. In diamond mining there must necessarily be a considerable amount of individual handiwork. There are immense facilities for speculation. It would almost seem that to work it profitably a system of slavery must be adopted. It is, therefore, to be distinctly understood that, except by a mere chance, diamond mining will not prove a rapid road to fortune. Still, writes Mr. King, "for those content with a slow paying occupation and a hard life, involving close personal supervision of the workers, it would pay, provided such persons possessed capital sufficient to last them a few years."—*London Mining Journal*.

THE TRANS-SAHARA RAILWAY.—On his return to Marseilles recently, the chief of the Trans-Sahara railway expedition, Colonel Flatters, reported the practicability of a route about 200 kilometers south of El Golea, in 24° north latitude. The expedition found a reasonable amount of water, never having been three days without it, and in the course of the exploration a lake was discovered full of fish and surrounded by vegetation. The general character of the soil was a hard sandstone, though for 80 kilometers there was an arid belt of very hard limestone. The whole country is much infested with snakes and lizards, and among the wild animals are antelopes in great numbers. The tamarisk tree grows luxuriantly in the Sahara, acquiring a development of three and one-half yards in circumference. The price of salt is enormous, 100 kilos of this necessary article being valued at four slaves. As each slave is valued at 900 francs, the cost of two and one-quarter lbs. of salt is about 28 shillings. Col. Flatters met with great friendliness on the part of the Tovarais, and he entertains no doubt as to the feasibility of the project.

BUREAU OF ENGRAVING AND PRINTING.—During the last fiscal year the Bureau of Engraving and Printing delivered 7,143,241 sheets of notes and securities, of a face value of \$789,240,950; 15,252,306 sheets of Internal Revenue and Customs stamps, containing 330,822,266 stamps, and 765,251 sheets, and checks, drafts, etc., for the Treasurer of the United States and the disbursing officers of the several Departments, besides a large amount of miscellaneous work. The expenses of the Bureau for the year were: For salaries of officers on the pay roll, \$26,863; for labor and other expenses, \$383,171; total expenditures, \$910,034.

The San Francisco mint coined in October \$3,630,000. Of this \$1,580,000 was in twenty-dollar pieces; \$920,000 in ten-dollar pieces; \$530,000 in five-dollar pieces; and \$600,000 in standard dollars. During the last four months our mint has coined \$14,090,000, as against \$12,906,000 during the same time last year.

The Barbee & Walker Mining Co., of Utah, paid a dividend of 10c per share at New York last Monday, aggregating \$10,000. Milton S. Latham, formerly of this city, is President, and Richard L. Ogden, also formerly of this city, is resident manager.

At the Murchie mine, Nevada City, the new shaft, which has three compartments, is down over 400 ft., and is timbered as far down as 280 ft. The engine to be used for hoisting will be 180-horse power, and will hoist 1,000 ft. in one minute.

A Growing Vice.

During the month of October the police of this city made 2,103 arrests for various offenses. One might imagine we were somewhat of a lawless community judging from these figures; but on segregating the offenses it is seen that the greater majority are for what are known as minor offenses. Thus there were: for battery, 160; carrying concealed weapons, 23; disturbing the peace, 23; profane language, 110; misdemeanor, 142; vagrancy, 25; drunk, 1,071; common drunkards, 29.

It will be noticed that over half of the arrests were for drunkenness, a most deplorable feature, since this leads so frequently to grave offenses against the laws. There is hardly room to doubt that eight out of ten of the entire number of offenses owe their cause originally to the vice of drunkenness.

It is rather out of our province to write temperance lectures, even if we felt the inclination; but we cannot let the opportunity pass to call attention to the above figures which form in themselves a stronger temperance lecture than could be delivered. Out of a little over 2,000 arrests in this large city in a month over a thousand are for drunkenness. The respectable and sober citizens have to keep a force of men employed night and day to look out for a class who cannot take care of themselves. When over 1,000 men have to be arrested for drunkenness in any one month in our city, the spread of this insidious vice can be appreciated. The damage that these individuals may have caused during their drunken spree, it is impossible to calculate. The heartache, distress and destitution which has been brought upon their families must be imagined. It cannot be pictured or described.

AN AFRICAN "GRAPE" VINE.—The French are scouring the corners of the globe in the hope of bringing to light something in the form of a grape vine which will withstand the phylloxera. They have been growing wild American vines, wild Mexican vines—in fact wild vines from nearly every where in the hope that native wildness may be found some where with such vigor that the insects which lay low their fine cultivated grapes may be powerless against it. The latest report of a discovery of this character comes from the French explorer, M. Lacart, who is at present on the banks of the Niger, writes home from "Koundian (Ganganar), July 25th," that he has discovered a new vine which promises to be of great economical value. He says the fruit of the vine is excellent and abundant, its cultivation very easy, its roots tuberose and perennial, while its branches are annual. It can be cultivated as easily as the dahlia. He himself had been eating the large "grapes" of the vine for eight days, and found them excellent, and he suggests that its culture ought to be attempted in all vine-growing countries, as a possible remedy against the phylloxera. He is sending home seeds for experiment, both in France and Algeria, and will bring home specimens of the plant at all stages. This announcement comes direct from Paris, and must have some basis to it. Accepting it, therefore, until we know better, it must be acknowledged to be a flank movement on the phylloxera, for if we can grow grapes on what is not a grape vine there seems nothing left for the pest to do but to step out of the controversy.

THE QUEEN BUYS AN AMERICAN MACHINE.—Those readers who know how much English merchants and mechanics set store by the right to announce themselves as merchants or manufacturers "to Her Majesty," it becomes a matter of much interest to know that an American manufacturer has gained the right to place the Queen's arms over his door. We learn from Scotch papers that at a trial of self-binding reapers at Aberdeen, September 16th, the Queen was present, and was so well pleased with the working of Woods' string-binding reaper that she ordered one for her farm at Abergeldie, to be delivered for the harvest of 1881. The Aberdeen Free Press of September 17th, says: "In the course of the afternoon, and while the machine was at work, Her Majesty, accompanied by Princess Beatrice and attendants, arrived at the field. Her Majesty closely examined the binding of the sheaves, and graciously expressed her admiration of the work performed. In reply to Her Majesty it was explained that the machines had been at work in this country for five years, but that now twine had been substituted for wire in binding. The spectators, who had stood at a respectful distance during her Majesty's stay, lifted their hats as the Royal carriage drove off." It is not American to express much more elation at the favor of a sovereign than of any other well-disposed person, but the significance of the event lies in the position granted to an article of American design and manufacture, while there are several English machines contrived and claiming to do the same work. It is in fact a tribute to an American invention which is a credit to the progress of our industrial interests.

In the Ord district, Los Angeles, a 10-stamp mill is to be put up on the Stanway ledge. The ore runs \$20 per ton, and can be mined and milled for \$14.

News in Brief.

NAPA grapes are being shipped to Chicago. The Pondas of South Africa have rebelled. The steamers plying on Feather river have been doing an immense business the past three months.

The public debt was reduced over \$7,000,000 in October.

The miners at Columbiana, Ala., have struck for higher wages. There was a shock of earthquake on Sunday night in Newcastle, Ont.

During the month of October the police of this city made 2,103 arrests.

Five hundred of Sitting Bull's band have surrendered to General Miles.

Mount Vesuvius continues in active eruption, and streams of lava are flowing down the western sides.

A LIFE BOAT capsized recently in Harbor Wells, Norfolk county, England, and 11 of the crew were drowned.

The Princess Olga, youngest daughter of the King of Greece, died at Athens this week, after a few days' illness.

The Porte is sending troops and ammunition to the Greek frontier. Unless the Turks retire to a new frontier, war is certain.

The bark County of Richmond of New York foundered on Oct. 14th, off Brazil. Her Captain and most of her crew were drowned.

ULYSSES S. GRANT, second son of Gen. Grant, was married this week to Miss Fannie Chaffee, only child of ex-Senator Chaffee, of Colorado.

ONE HUNDRED AND EIGHTY-SIX British and foreign wrecks were reported last week. Of these, 161 vessels were lost on the British coast.

ANOTHER terrific hurricane, accompanied by a blinding storm, has passed over Denmark. The railways are blocked and a score of wrecks are reported.

SEVEN THOUSAND Montenegrins are preparing to collect at a camp near Antivari by Sunday night. An attack on Dulcigno is considered possible.

THREE car-loads of lumber were shipped from Sacramento market to Arizona last Friday—one to Tucson, one to Benson, and the other to Maricopa.

FIGHTING continues along the Russian lines in the Turkoman Steppes. Gen. Skobeloff proposes to declare a state of siege in the Trans-Caspian region.

THE Department of State is advised by our Ministers to Chile and Peru, that the conference between the Powers, under the good offices of the United States, closed without results.

SHEIK ABOALLAH has sent a communication to American missionaries in Kramiah requesting them to hoist the American flag above the Mission building, in order that it may be recognized and respected when the city is attacked by the Kurds.

On Sunday last, the Los Angeles train when within five miles of the city, broke a wheel and ditched seven cars, but fortunately injured nobody. The engine was not thrown from the track. The passengers were badly shaken, but escaped with only a fright.

THE mate and one of the crew of the bark County of Richmond, from New York, were taken from a raft, after six days' sail on it, near Leghorn, by an Australian bark. Their vessel foundered in a hurricane on Oct. 14th, and all the rest of the crew were drowned.

THE Peruvian Guano Co., of New York, have received this telegram from Chile, October 28th: "All the negotiations for peace between Chile and Peru were fruitless. Peru refuses to cede Tarapaca. Preparations are being hurried for a Chilean expedition against Lima."

A SAN ANTONIO telegram received from Gen. Grierson says that a band of about 30 Apaches, a remnant of the Victoria party, has crossed Rio Grande to Texas, and killed a corporal and two private soldiers. The Indians were pursued by Baldwin's company and driven back to the mountains of Mexico.

THE Chicago Tribune recapitulates the results of the great storm on the lakes on Oct. 16th. Over half a million dollars' worth of damage has been done to vessels and cargoes, and 92 persons have perished; 17 vessels were totally wrecked, and involving a loss of \$153,000, and 66 vessels were damaged.

GOVERNOR PERKINS has presented to the California Rifle Association a handsome gold medal to be shot for annually at the fall tournament of the Association, under such terms as may best promote skill in the use of the rifle and stimulate an interest in rifle practice. The trophy will be known as "Governor Perkins' Medal."

BALTIMORE papers estimate that nearly 80,000 people were brought into that city on October 12th, the day of the great celebration there. Of these the Baltimore & Ohio road is estimated to have brought 45,000, the Northern Central, 15,000, the Philadelphia, Wilmington & Baltimore, 10,000, and the Western Maryland 7,033. No accidents occurred in handling this great multitude, and the railroads must have made a handsome amount out of it.

PARNELL, speaking at the meeting in Limerick on Sunday, said that Parliament would not reduce rents, but when farmers had reduced them, Parliament would interfere and render the continuation of the agitation useless. It was necessary to adopt a platform which would profit laborers as well as farmers. They had got rid of the proprietors in France, Prussia and Belgium; why not in Ireland? He advised the people to offer a just rent to the proprietors, as then the question may be settled this winter.

HALL'S VEGETABLE SICIALIAN HAIR RENOWER is a scientific combination of some of the most powerful restorative agents in the vegetable kingdom. It restores gray hair to its original color. It makes the scalp white and clean. It cures dandruff and humors, and falling out of the hair. It furnishes the nutritive principle by which the hair is nourished and supported. It makes the hair moist, soft and glossy, and is unsurpassed as a hair dressing. It is the most economical preparation ever offered to the public, as its effects remain a long time, making only an occasional application necessary. It is recommended and used by eminent medical men, and officially endorsed by the State Assayer of Massachusetts. The popularity of Hall's Hair Renower has increased with the test of many years, both in this country and in foreign lands, and it is now known and used in all the civilized countries of the world.

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THE RISING MONTHLY OF THE DAY. YEARLY SUBSCRIPTION \$4. Single number 35 cents. **AGENTS WANTED** in every town and village of the United States to canvass for this popular magazine. The most liberal commissions will be paid to responsible parties. This is a chance to make money at your own home. Address
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Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce and valuable for future reference and library use.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Chew Jackson's Best Sweet Navy Tobacco

METALS.

(WHOLESALE.)

WEDNESDAY M., Nov. 3, 1880.

IRON.—	
American Pig, soft, ton.....	32 00 @ 33 00
Scotch Pig, ton.....	25 00 @ 27 00
American White Pig, ton.....	— @ —
Oregon Pig, ton.....	— @ —
Refined Bar.....	41 00 @ 81
Horse Shoes, keg.....	7 00 @ 8 00
Nail Rod.....	9 @ 9
Norway, according to thickness.....	81 @ 91
STEEL.—	
English Cast, lb.....	16 @ 18
Black Diamond, ordinary sizes.....	13 @ 15
Drill.....	9 @ 10
Flat Bar.....	— @ 16
Flow Steel.....	9 @ 10
COPPER.—	
Ingot.....	— @ 52
Sheet.....	— @ 20
Sheathing, Tinned 14x48.....	— @ 42
Nails.....	— @ —
Bolts.....	38 @ 42
Old.....	— @ 18
Bar.....	— @ 22
Precipitate, 100 fine.....	18 @ 19
LEAD.—	
Pig.....	41 @ 5
Bar.....	— @ 8
Pipe.....	— @ 8
Pipe, Soil.....	— @ 9
Shot, Discount 10% on 600 Bags.....	— @ 210
Buck.....	— @ 230
Chilled.....	— @ 250
TIN PLATE.—	
10x10 Charcoal.....	— @ 10 50
10x14 C Ooke.....	10 00 @ 10 00
Banco Tin.....	— @ 25 00
Australian.....	— @ 20 00
I. C. Charcoal, Roofing 14x20.....	21 50 @ 23 00
" " " 20x28.....	21 50 @ 23 00
ZINC.—	
By the Cask.....	— @ 10
Zinc Sheet 7x3 ft. 7 to 10, lb. less than cask.....	10 1/2 @ 11
NAILS.—	
Assorted sizes.....	4 00 @ 4 75

LUMBER.

WEDNESDAY M., Nov. 3, 1880.

PINE AND REDWOOD.	
CARGO RATES.	
PINE.—	
Rough.....	16 00
Flooring & Step, No. 2, 24 00	
REDWOOD.—	
Rough.....	16 00
Surfaced.....	25 00
RETAIL RATES.	
PINE.—	
Rough.....	20 00

Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by BUTTS & CO.)

SAN FRANCISCO, NOV. 3 P. M.

SILVER.—
GOLD BARS, \$90@910. SILVER BARS, 10@15 1/2 cent. in gold.
EXCHANGE on New York, 15@20, on London bankers, 40@45
491. Commercial, 50; Paris, five francs @ dollar; Mexico dollars, 50@51.
LONDON (Cable), 94 15-16; Bonds (4 1/2%), 112 1/2.
QUICKSILVER in S. F., by the cask, 2 1/2 @ 4 1/2 lb.

Meteorological Summary for the Month of October, 1880.

Station, San Francisco, Cal.

Date	Mean Daily Barom.	Daily Mean Temp.	Daily Mean Humidity.	Prevailing Direction	Daily Rain-fall.
1.....	30.071	54.00	81.3	W	....
2.....	30.100	54.25	83.7	W	....
3.....	30.073	54.00	83.0	W	....
4.....	30.058	57.25	82.0	W	....
5.....	30.008	57.25	85.7	W	....
6.....	29.920	55.00	81.0	W	....
7.....	29.893	58.00	82.0	SW	....
8.....	29.848	50.75	74.3	W	0.05
9.....	30.022	57.50	72.3	SW	....
10.....	30.015	60.50	50.3	W	....
11.....	30.093	63.75	26.8	NE	....
12.....	30.124	57.75	62.7	W	....
13.....	30.210	54.50	77.0	W	....
14.....	30.005	60.00	66.0	NE	....
15.....	30.099	65.25	40.7	NE	....
16.....	30.139	60.75	34.7	N	....
17.....	30.036	68.50	41.0	N	....
18.....	30.023	63.75	38.7	NW	....
19.....	30.083	64.25	26.8	N	....
20.....	30.082	54.50	84.0	W	....
21.....	30.140	55.50	83.7	W	....
22.....	30.101	55.25	82.3	W	....
23.....	29.992	55.50	84.3	W	....
24.....	30.071	60.00	82.3	SW	....
25.....	30.058	62.50	79.7	SW	....
26.....	30.001	62.75	78.8	W	....
27.....	30.068	57.00	84.7	SW	....
28.....	30.013	56.50	85.7	W	....
29.....	30.020	50.50	70.7	NW	....
30.....	30.018	57.25	76.3	NW	....
31.....	30.054	55.00	81.3	W	....
Sums.....	331.378	1,825.25	2,204.7	....	0.05
Means.....	30.044	58.88	71.12	W	....

NELSON GORON, Serg't Signal Corps, U. S. A.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

Office of the Standard Consolidated Mining Co., San Francisco, November 1, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 21, of Seventy-five (75) cents per share, was declared, payable on Friday, November Twelfth (12), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York. WM. WILLIS, Sec'y.
Office—Room No. 23, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

Lewis Consolidated Silver Mining Company.—Location of principal place of business, San Francisco. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2d) day of October, 1880, an assessment, No. Three (3), of Ten (10) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 15, No. 310 Pine Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the First (1st) day of December, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the (20th) Twentieth day of December, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
J. W. FEW, Secretary.
Office—No. 310 Pine Street, Room 15, San Francisco, Cal.

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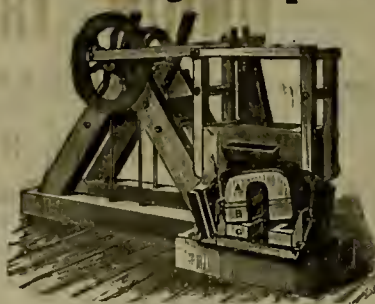
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In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

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The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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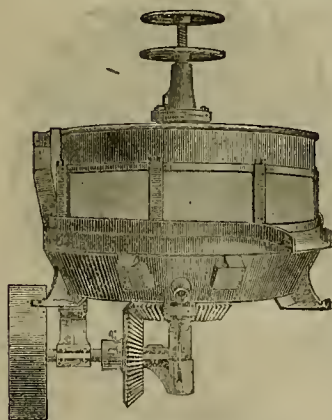
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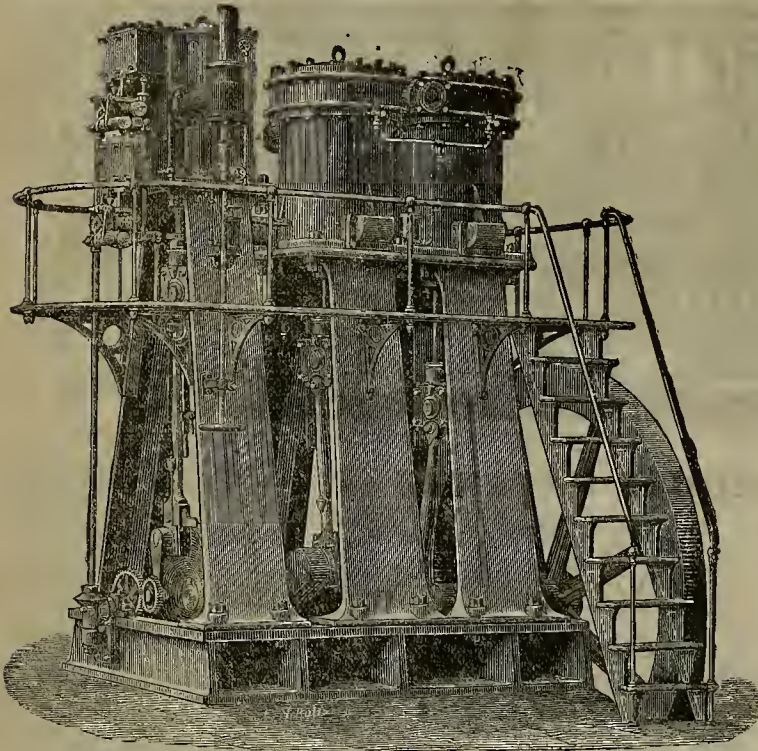
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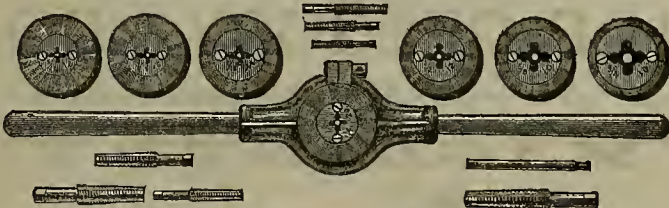
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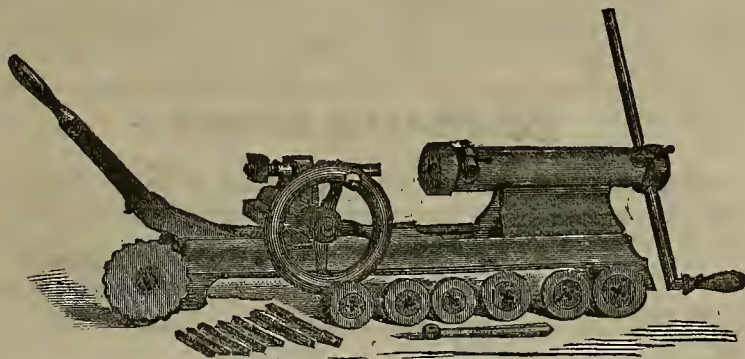
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MINING AND SCIENTIFIC PRESS.

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SAN FRANCISCO, SATURDAY, NOVEMBER 13, 1880.

VOLUME XLI
Number 20.

The Clayton Air Compressor.

It has been the subject of frequent remarks by those most familiar with practical mining operations, that while great improvements have been made in the means employed for draining mines of surplus water, properly ventilating the workings, and for elevating the products of the mine to the surface, since the advent of the steam engine, that but little effort was made, and less accomplished in the way of lightening the labor of the miner, or rendering his efforts more effective, until the introduction of the power rock drill. True the miner's pick in form and general adaptability for its work was a marvel of lightness combined with strength, but its effectiveness depended solely upon the

the head, in a length of "one mile and 15 yards." Its escape into the surrounding atmosphere after performing its work in the "drills," "coal-cutting machines," engines or pumps, furnishes the supply of cool, pure air, which under any circumstance is a necessity. In considering the expenditure necessary to its introduction, it should not be forgotten that it eliminates from the mine's expense account the large amount which would be otherwise expended to secure ventilation.

Of late years air compressors have become a recognized necessity in mining operations, and all interested in this field of enterprise will be pleased to note the efforts made by manufacturers to improve their construction and increase their efficiency.

The accompanying illustration shows a Duplex Air Compressor, built at the Clayton Steam Pump Works, Brooklyn, N. Y. While it bears

first around the ends of the cylinder, one of which, at the completion of each half-stroke, is exposed to the greatest degree of heat developed by the compression of the air. The object of this arrangement is to correct any tendency to unequal expansion in different parts of the cylinder.

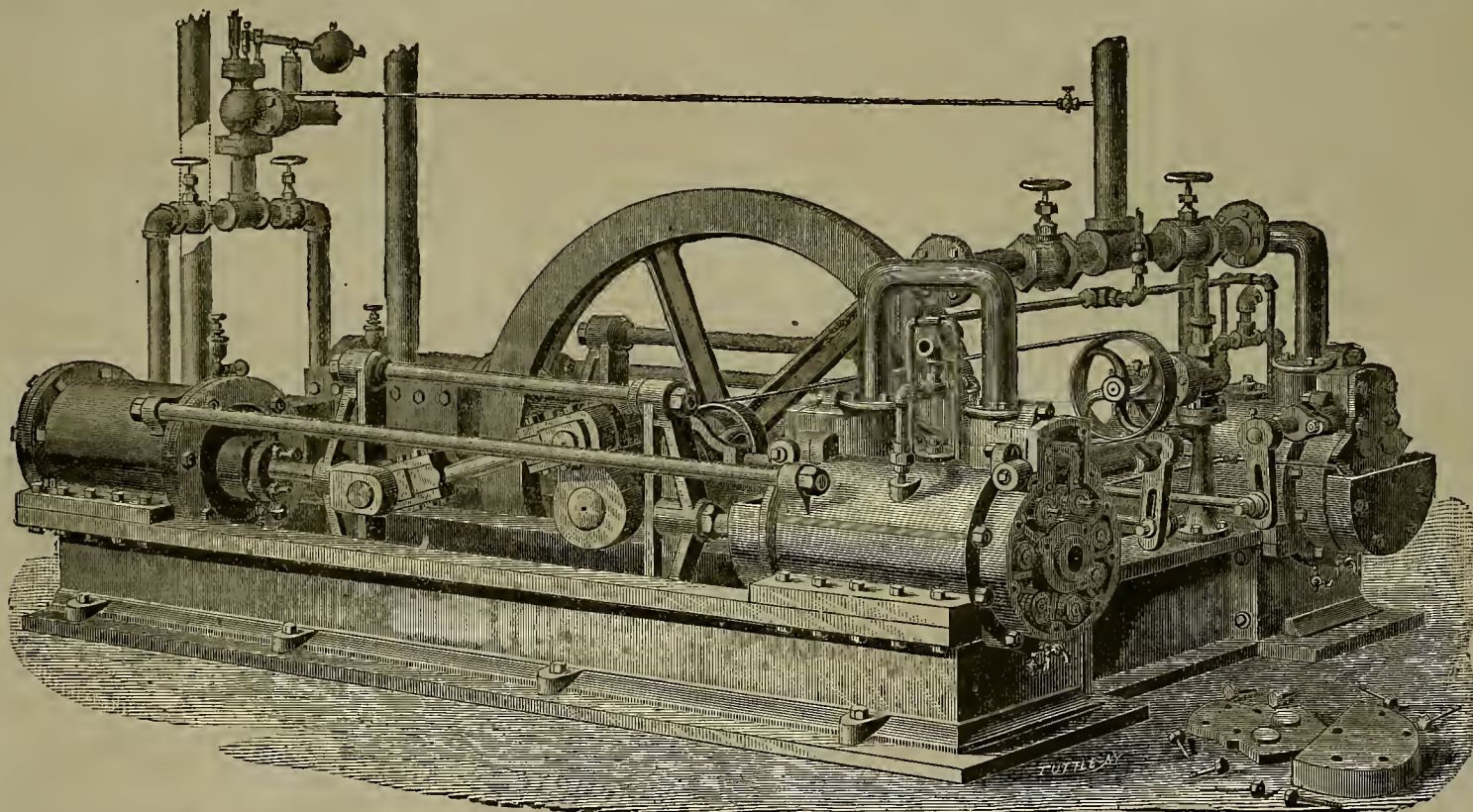
The induction and eduction valves are both placed in the cylinder covers, and are arranged so that the "valves" and "seatings" can be unscrewed and removed by simply taking off the cover. Discs of semi-elastic material are interposed between the valve faces and seats, which diminish the shock due to the quick seating of the valves, and protect the metal faces from wear, besides being quickly and cheaply replaced when worn.

Those who are familiar with indicator diagrams taken from air-compressor cylinders have noticed the "hump" on the cards, occasioned by

fill up the "clearance," has long been practiced by many builders. The improvement herewith shown consists in the manner of controlling and regulating the amount.

The general practice of allowing a small stream under pressure to flow in with the air and without automatic adjustment and control was open to serious objections. The revolving lubricating cock, seen in position between the two air-cylinders, and connected by belt with the main shaft, supplies a measured quantity of fluid to the cylinders at each stroke, maintaining a uniform supply per stroke regardless of the speed at which the compressor is run, and shutting off the supply when not in operation.

The suction-valves which open into the air-cylinders are supplied with "safety stems," which will prevent any accident from following the breakage of a valve from its stem, which has hitherto been one of the most fruitful



THE IMPROVED CLAYTON AIR COMPRESSOR.

strength and skill of the individual miner, while the hand drill and sledge were their sole reliance for removing rock, and the mule and boy monopolized the conveyance of the "output" of the mine to the foot of the shaft.

The power rock drill, as originally made, was designed to be operated by steam, and for quarrying and surface drilling the escape of the "exhaust" steam was no objection; but in the remote workings of the mine, its mingling with the already impure air was so objectionable, that it would have been a serious drawback to the general introduction of power drills, and in many cases would have led to their abandonment.

The success which attended the employment of compressed air at the Hoosac Mountain and Mt. Cenis tunnels as a means of conveying power through long distances, suggested its employment more generally in mining operations. Aside from the convenience with which it can be conveyed through crooked and difficult passages to the most remote points in the mine, and with so small a loss in transmission, that at the Hoosac tunnel the average loss of pressure from leakage, etc., was, on an average, but 2 lbs. after traversing 7,150 ft. of 8-inch pipe; and at the Mt. Cenis the loss sustained was but 3½ of

a close resemblance in many respects to the machines manufactured by this concern (illustrated and described at length in the PRESS of January 10, 1880) during the past six years, it possesses a number of new and distinctive features, and shows that Mr. Clayton has bestowed particular attention upon the construction of the air cylinder and its adjuncts. In this compressor a connecting rod is substituted for the sliding boxes formerly placed in the yokes, which are now allowed to remain sufficiently far apart for its admission, the yokes being rigidly connected on top by a brace rod, and at the bottom by a distance piece, which also serves as a slide, running an adjustable slipper guide (not shown in cut), which takes all the weight of the yokes, rods, pistons, etc., from off the cylinder bore.

This mode of construction allows the fly-wheel to be placed in the center of the machine and admits of the machine being braced from cylinder to cylinder, in such a manner as to secure great strength without an unreasonable weight of iron.

Instead of allowing the water to enter the jacket and follow its own course to the outlet, it is received at the center of the top of the air-cylinder, and the construction of the jacket is such that the cold water is compelled to travel

the excess of pressure (above that in the receiver) required in the cylinder acting upon the reduced area exposed to its pressure, as compared with the extent of surface upon which a counter pressure is exerted by the air in the receiver and delivery pipes. This excess of pressure frequently amounts to 30% and even 50%, and causes a loss of power as well as subjecting the whole machine to a succession of unnecessary shocks and jars. This difficulty is obviated in these machines by the use of a tripping device receiving a positive motion from an eccentric on the main shaft, and which admits of being adjusted to lift the valve at such a period in the stroke as corresponds to the air pressure maintained in the receiver.

Probably no one point in the construction of compressors has received more attention than means for reducing the "clearance space" to a minimum. In the air-cylinder any air remaining unexpelled at the completion of the stroke will re-expand to its original volume and pressure before any more is admitted through the proper valves, consequently the capacity of the compressor is reduced at each half-stroke by an amount represented by the volume of unexpelled air at its normal density. The introduction of some fluid, usually water, into the cylinder to

sources of accidents to air compressors.

The patent air governor (of which we understand Mr. Clayton is the sole licensee) is attached to these compressors. It can be set to any required pressure, which it will maintain without variation, it being immaterial whether steam is at 50 or 100 lbs. pressure, or the number of drills or other machines which may be working at one time.

To assist our readers in forming their own judgment of the value of the foregoing features, we give on page 316 of this issue a series of "indicator diagrams" taken from the air and steam-cylinders of these compressors, [which very clearly show the percentage of economy effected by their use.

By applying the indicator to the compressor-cylinder when the different parts are in position a card is given showing the results obtained through the use of the special appliances employed, and when these appliances are omitted, one by one, in subsequent diagrams, a comparison of results will show the relative value of each feature.

These cards are worked up by the same rules as are, followed in working up steam-engine cards. The resistance of the air to the advance

[CONTINUED ON PAGE 316.]

The Granite Basin Quartz Mines.

On Saturday last a *Plumas National* reporter made a trip to this portion of Plumas, and spent a day or two in looking over this district. He says: There are now about 40 men in the basin, several of whom have families, and who have gone there with the intention of making permanent homes. The mines are all quartz—not a washed gravel stone in the district. It was one of the first mining camps in the county, and the numerous ravines were worked out years ago, and yielded very rich returns for the slow and crude methods of mining in the early times. The gold was all of a character known as "quartz gold," and must have been washed into the gulches from the innumerable ledges which cross them in every direction. Most of the lodes now claimed are comparatively small, ranging from 12 inches to four or five ft. in width, and in most cases the country-rock is granite, occasionally one being found with porphyry on one side and granite on the other. Nearly all of them contain a large percentage of gold-bearing sulphurets, and there is no doubt but that these will prove the most valuable portion of the quartz as soon as the proper method or process for extracting the gold from them is brought into use. At present the gold in the sulphurets is lost. The rock is nearly all rich in free gold, ranging from \$5 to \$50 to the ton, with an occasional "spot" or "bunch" which would pay 10 times that. There has never been anything like a fair test of the rock, and although hundreds of tons have been crushed, it is plain to a practical quartz miner that the returns have not been one-half what they should have been, and the tailings now deposited in the beds of the streams will show a prospect equal to the best rock of many mines in other places.

One of the largest ledges in the district, called the Frenchman ledge, is now owned by the Franklin company, all of Susanville, Lassen county. The ledge is some three ft. in width, or that should be about an average, as it runs from two and a half to six ft. It was purchased by the present owners from a Frenchman named Lose, who had made it pay well by working the picked rock in an arastra, or pounding the very rich portions in a hand-mortar. The present company have had some of the rock crushed since they got possession, and although imperfectly worked it yielded at the rate of \$17 or \$18 per ton. The ledge is well developed to the depth of about 100 ft., is well cased up, and a clay seam is found on one side of it in every opening. A new tunnel has been started on the west side of the hill, and the grading for a new mill has been done. The mill machinery is expected every day from San Francisco, and will be put up as rapidly as possible. The cars will run from the tunnel directly into the mill, which will be a 10-stamper, run by steam. The rock is easily worked and but very few miners are required to keep a supply for a mill of that capacity. The new company certainly have very flattering prospects, and will probably be running 20 or 30 stamps before another winter after the coming one.

Swan & Ament own the first extension east on the Frenchman ledge, and have taken out considerable money from the little 9-stamp mill. The ledge in their claim has proved fully as good as in the other location, and some of the red sulphurets are wonderfully rich. They have a good property.

Close to the Frenchman is a smaller lode, owned by Jos. Peppin, and named the "Basin Beauty." No work has been done on it until lately, but it shows up rich in free gold, and at one of the openings a pile of rock is waiting for the crusher which will give big returns.

Over the hill, about three-quarters of a mile is situated the 8-stamp quartz mill owned by Rev. A. P. White. This mill has been at work on rock from different ledges, and Mr. White has not worked any rock from his own mine, the Granite, this summer. It is said to be a fine vein, and will make a good showing. Near this is located the "Jenny Lind," now idle, owned by Gov. Perkins, and the Sparks ledge, both counted good property by the miners in that section. An Eastern capitalist, named Parker, is now negotiating for the Sparks, Granite and some others, and if the sale should be made, work would commence on them on a grand scale.

A short distance down the ravine is located the "Irishman's Ledges," owned by Sullivan & O'Brien. On Tuesday they sold one of their claims to a gentleman named Christy, for \$4,800. This vein is small, but prospects and pays very richly, the rock being worked at present in White's mill. The wall rocks are soft and the quartz is easily mined. O'Brien & Sullivan still retain another ledge across the ravine, which is one of the finest prospects in the basin. A short tunnel has been run, and a small stope put up, showing the lode about three ft. wide going straight down. A run was made from this rock in an arastra, and from 20 tons the result was 18 ounces. The owners will run a tunnel into it this winter, and propose to put up a mill the first thing in the spring. They have a valuable mine, and deserve it, for they are hard workers and "mean business."

Across the creek, on the first extension of the same lode, Pres. Lyttaker has developed a splendid looking ore body, carrying fine sulphurets. He thinks he has got a small fortune, and it looks as though he was right.

Mr. Morgan Williams, of Susanville, is putting up a new 10-stamp mill to crush rock from his mines, the "Homestead" and "Mexican." He is said to have an abundance of gold quartz, and is sure of success.

See & Jolly are working a small vein a mile or

so from the Franklin. It is wonderfully rich, and they work considerably by "hand mortar process," getting \$15 or \$20 per day for their labor. They are storing their rock in the mill dump, and will crush it as soon as the winter storms set in. We intended to give them a call on Monday, but got off on one of the innumerable roads of that section, and missed the mine entirely.

Several other ledges have been discovered and located, and show well for the work done. The future of the basin is certainly very promising, and a flourishing mining town is sure to spring up there. There is an abundance of quartz, and rich quartz, too, and all that is needed to make it valuable is intelligent management.

The Green Mountain Mill.

The editor of the *Greenville (Plumas county) Bulletin* has been visiting the Green Mountain and Cherokee mines. Concerning the new mill of the Green Mountain Co., he says: In the construction of the mill there was used the following: 175,000 ft. of lumber, 40,000 shingles and 5 tons of iron bolts. The building is 50 ft. wide, 95 ft. long and 55 ft. high from the sill to the ridge, and is surmounted with a fine large cupola, from which is obtained a magnificent view of the valley beneath. As the building is built in the bank, excavations had to be made and a place graded 80x100 ft., leaving a bank in the rear of the building 30 ft. high. The rock room has a capacity of 1,500 tons.

In the mill there are 175,000 lbs. of machinery, which are propelled by a Knight burdy wheel, 6 ft. in diameter, for which there is a supply of 150 inches of water, with 420 ft. pressure, giving 144-horse power. There are 12 mortars of 5 stamps each, making 60 stamps in all, and each mortar weighs 5,000 lbs. These are fitted with patent self-feeders, requiring but two men to attend to all the stamps, and so convenient is the mill that 6 men on each shift are all the force required while it is running.

The cam shaft is 5 inches in diameter, and the main driving pulley on the wheel shaft is 3 ft. from which, by an immense 5-ply rubber belt 36 inches wide, power is transmitted to a 12-ft. pulley on the counter shaft, weighing 5,000 lbs. From this there are 4 48-inch pulleys belted to 7-ft. pulleys on the cam shaft, so that each 15 stamps can be run independently of the others.

The dump has a capacity of 1,000 tons, and is connected with the mill by a tramway 1,025 ft. in length, having 2 tracks on which cars are run, holding 1½ tons each, the loaded car down pulling up the empty one, a drum and brake regulating the speed. The cars can make 10 trips per hour, carrying 15 tons, or 150 tons in 10 hours, which will keep the stamps at work for the 24 hours.

To cover the numerous area of battery aprons 1,750 lbs. of silvered copper plate are used. The frame of the building is composed of massive timbers, generally 12 to 16 inches square, of which 10,000 ft. were used, smoothly hewed. The frames of battery and shafting are planed and nicely painted. Substantial stairways lead to all the upper portions of the building, every part of which is easily accessible. The company intend to have a complete system of fire hose and water pipes throughout the building, connected with the pressure from the main pipe, so that the entire mill could almost instantly be flooded in case of fire. The supply of water comes from Round Valley reservoir, which is owned by them and covers 700 acres, and reaches the mill through 7 miles of ditch and flume.

EUREKA COAL COMPANY.—The Eureka Coal Co. are still pegging away with their tunnels and shafts, headed toward the center and base of Bald mountain. They have been rewarded for upwards of 18 months' work in that they have found coal of a first-class character, but the stoping and freighting have been considered too expensive a feature to offset the work necessary. Yesterday fresh supplies and hands were sent out and the prospecting will be continued at least two or three months longer. The coal found in this company's ground is of the class for which our blacksmiths pay enormous sums, to use in welding, and if the next four months' work does not develop a large vein of coal, the body now in sight will be stowed out to help defray the expenses of the company. That coal of an "A No. 1" quality exists in close proximity to Eureka has long ago been demonstrated, and the quantity is the only matter of question now, and it is the point which the above company propose to solve before spring. —*Eureka Sentinel*.

BAD NEWS FROM MAMMOTH.—We learn that about everybody is leaving Mammoth City. More than half the business houses are already closed up, and great depression prevails. The principal hope of the camp centered on the Headlight and Monte Christo tunnel, but it is now long past the point where it should have tapped the ledge. We regret this bad outlook for that Mono county camp quite as much as if it was within our county lines; it is bad for Inyo interests every way. A large portion of the late residents of Mammoth, however, are coming in this direction to seek their fortunes, and some good may eventually come to us in that way. —*Inyo Independent*.

New pumping machinery has been purchased for the Lent shaft, now being sunk jointly by the Bodie and Mono Cos., at Bodie, and will be erected at once.

Eureka Mining District.

Hitherto the channels by which the capital of English investors has found its way for the promotion of mining enterprise in the far West have lain chiefly in the direction of California. Large sums have been spent in the development of the famous mines existing there. The profits resulting from the employment of capital in that mining country have been enormous. The operations carried on have been useful as demonstrating the vast mineral resources of the New World. It must not be forgotten, however, that other mining districts beside the above afford a lucrative opening for English capital now lying idle. The success and well-merited reputation of such companies as the Richmond and Eureka Con. point out a new field in which skilled enterprise will meet its reward. Eureka county, Nevada, as proved by the operations of these and kindred associations, is developing a richness which will probably place it in the first rank among American mining centers. Constant reports come to hand of the active opening up of the district of Eureka.

New mines are continually being started, and in most cases with very encouraging results. The success of local miners will undoubtedly attract investors here, and no reason exists why capital on this side of the water should not participate in the profits which are at present being realized in Eureka district. Among the numerous paragraphs in the local newspapers relative to current mining operations we quote for the information of our readers the following from the *Sentinel*: In regard to the Ruby and Dunderberg it is stated that "The Ruby and Dunderberg have their working shaft down a depth of 600 ft., and before stoping will sink 100 ft. more. The prospects of the mine are very flattering.

In regard to the Williamsburg it is remarked, by the *Ruby Hill Mining News*, that "there is a general feeling among miners on the mountain that the Williamsburg is destined to prove one of the big mines of the district. There is no diminution of the ore output, and it is thought that when more thoroughly prospected it will prove a veritable bonanza."

The Albion mines, near neighbors of the Richmond have discovered a most valuable ore body, which is spoken of as one of the most important ever made in this district. One of the favorable features of Eureka district mining is not so much the high grade ores as the marvelous supplies which in each well-managed mine are brought to light. There is not a single instance where a fairly opened mine has not richly repaid the fortunate adventurers engaged therein by the vast paying ore bodies laid open. Capital is alone required, combined with energetic and able management, to make the Eureka district one of the most favorite fields of mining enterprise. —*Eureka Sentinel*.

THE UNION PACIFIC RAILWAY.—This road, originally built simply to form part of a trunk line from the Missouri river to the Pacific, is rapidly developing means of support other than from its trans-continental business, which we understand now forms only about 24% of its receipts. It has already several branches in Nebraska, aggregating nearly 250 miles, is building about 150 miles from near Julesburg to Evans, on the Denver Pacific, saving about 60 miles to Denver, is about to build a line northward to the Black Hills, and its Utah & Northern branch has already been pushed northward from Ogden 350 miles into a mining and grazing region of great wealth, while a branch from this line westward to the Columbia river at about Walla Walla, whence the Oregon Navigation company's road will give a route to the Pacific coast, is projected and will doubtless be built. Meantime a vast region of Nebraska and the western Territories remains to be made tributary to its main line as may be found advisable. —*Railway Age*.

THE MINING OUTLOOK IN ESMERALDA.—For some time there has been an undercurrent at work in San Francisco and this place in regard to our mines, and within the last few days it has come to the surface that the Cook Bros., the wealthiest and most influential mine operators on the Pacific coast, have got control of the Prospectus mine, formerly owned by Gov. H. G. Blasdel, and were going to work in a business-like way to develop the property. For some time past San Francisco and New York capitalists have been looking into the merits of our mines. Now we have it for a certainty that two men, whose judgments in mining matters have been very correct, have decided to open up one of our most promising mines. Other companies are making inquiries into the merits of the camp, and we may reasonably expect before very long to see work started in earnest upon several other mines here. —*Herald*.

A PROFITABLE SPECULATION.—The Little New York & Manhattan Beach road of three ft. gauge, running from Greenpoint, N. Y., to Manhattan beach, 15 miles, with a branch from Bay Ridge eight miles, carried, says the *Railway Age*, during the season of four months from May 27th to September 25th, no less than 2,003,000 passengers, and that too, without injuring one. We are not informed of the gross receipts, but they must have been very large, even at the rate of fifty cents including steam fare, for the round trip from New York. The operating expenses were only 40% of the earnings. The road has done its work for the year, and its rolling stock has been laid up under cover, until summer again calls the multitudes to the sea coast.

Cory Mining District.

From a correspondent of the *Bodie Standard-News*.

Its Situation.

Cory is situated on the Mount Grant range of mountains eight miles south of Walker lake, and eight miles from Hawthorne, the termini of the Nevada & Colorado railroad. This district was discovered in September, 1878, by Eugene Gallagher, an old prospector of large experience, who located, and to some extent, worked the big Indian mine that is proving to be one of the most valuable mining properties in Nevada.

The Big Indian Mine

Is worked by a tunnel run on the vein a distance of 300 ft., showing in the whole course of the tunnel a strong and well defined vein of ore that will mill \$75 to the ton. There is no waste in the vein. The foot wall is hard and strong, with a slight pitch south, the vein running a little north of west, and south of east. We are now stoping and upraising on the vein, and have about 100 tons of ore that have been selected for the purpose of shipment to the Pine Grove mill, a distance of 40 miles.

The Golden Eagle Mine

Was discovered and located about one year since by Mr. Crossford, Buckingham and others. They are now sinking an incline shaft on the vein that is down on the ledge 90 ft. The ledge at the bottom is two ft. wide—all good ore that will pay to mill. They have now on three ore dumps over 80 tons of ore that, without sorting, will mill \$75 per ton. No drifting has been done on the ledge. The shaft will be continued down to a depth of 150 ft., at which point a station will be cut, drifts run on the ledge and the mine at this point thoroughly opened up.

Other Locations.

A number of other locations have been made by C. F. McKinney and others of Bodie, amongst which are J. Sparrow, John Gildea, Frank Doyle and P. Donahue. The latter gentleman is one of the original locators of the South Bulwer mine in Bodie district, and has charge of and working the mines here. These mines show well as far as worked. The ledges crop out boldly at the surface, have good, strong walls carrying a fine quality of ore, some of which is very rich and showing free gold in abundance. Every indication stamps them as true fissure veins.

Wood and Water.

There is an ample supply of wood and water for milling and mining purposes throughout the district, the mountains being densely covered with large mountain mahogany timber. Large springs of splendid water are to be found in every canyon, forming creeks of considerable size that can be carried to any point in close proximity to mines or mills. Roads can be built at light expense to the railroad center, and to all other points. Though unknown to-day, this camp will soon become a hollion producer and attract the attention of the mining world.

RARE ELEPHANTS.—There are now on exhibition in this city (New York) two peculiar elephants brought from the mountains of the Malay peninsula, about 800 miles from Singapore. They are remarkable for their small size, being respectively 28 and 36 inches tall; and for being covered with a thick coat of bristly hair or wool. They are supposed to be from five to seven years old. In size they resemble the extinct elephants of Malta, and in covering, those of Siberia. Their woolly coat is attributed to the circumstance that they live high upon the mountains where the climate is cold. The species appears to be all but unknown to naturalists, this pair being the first that have survived the passage through the heated low country to the coast and the subsequent journey by sea. The sailors on the steamer which brought them—the *Oxfordshire*, Capt. C. P. Jones—named them Prince and Sidney. They are described as playful and harmless, and they keep their little trunks stretched out to strangers to be petted. They love to be scratched on the under side of the trunk close to the mouth, and they hold their trunks curled back over their heads as long as anyone scratches them. Like elephants of larger growth, they keep up a swaying motion, either sidewise or forward and backward. When a visitor takes one of the little fellows take his hand he delicately curls his proboscis around it and carries it gently to his mouth. Then he trumpets his satisfaction. —*Scientific American*.

INTERESTING PHENOMENA.—A remarkable instance of lightning ascending vertically is reported to the French Academy of Sciences as having occurred last month at Paris. M. Trecul relates that during a violent storm just at nightfall of the 19th Sept. he saw flashes rising vertically, and apparently starting from the tips of lightning rods, though he is not sure that they started from them. The flashes went out in a kind of a luminous ball, diminishing in the intensity of the light from the center toward the circumference. One of the smallest of these had an oval shape of from 8 to 10 inches in width, terminating the column of fire. On two occasions two of these luminous columns, having risen a distance apart about equal to the space between two lightning rods, suddenly darted toward each other at right angles to their vertical course and went out on uniting, making no flash and no noise.

MECHANICAL PROGRESS.

American Iron and Wood for Ship Building.

It is said on high authority, that American ship building iron is superior in tensile strength to British iron; hence the increasing use of steel by English ship builders. British iron generally averages about 40,000 lbs. tensile strength to the inch, while the steel used for the same purpose has a strength of 65,000 lbs., and is only about $\frac{1}{4}$ cents a lb. dearer. According to the *London Times*, the Lloyd's rule allows a reduction of 20% in weight from iron when steel is used, which will give a saving in weight of hulls, as far as steel is used, of 150 tons out of every 1,000, which saving may be added to the carrying capacity of the vessel. The English Admiralty has taken the subject up, and invited manufacturers to supply steel plates under the condition that they should not exceed 30 tons, nor fall short of 26 tons per inch in tensile strain, while at the same time proving their ductility by certain bending and punching tests which are prescribed.

The Lloyd's are also advising the use of steel, and have laid down special rules for its use, raising the limits of tensile strength above those of the Admiralty by one ton.

The English steel manufacturers are making efforts to conform to these requirements, and ships of the largest class, steamers and sailers, are now being constructed of steel both for the navy and mercantile marine. The *New York Commercial Bulletin* suggests in this connection, that while our ship owners are considering their present inability to compete with foreigners, it will be very proper for them to take into consideration this new element, as it is quite likely that steel may economize transportation by sea, as it has on rails by land.

In this connection we call attention to the following paragraph, which we clip from an American journal called "*The Ship*:"—"American timber, as tested by Prof. Thurston, gives figures in tension from $\frac{1}{4}$ to $\frac{1}{2}$ higher than the European woods, with the exception of ash; the strength of American timber, as given by earliest authorities, is probably that of average specimens, and timber may be obtained, as in this case, by careful inspection, of a very much greater value, and it is quite safe to state that American timber has in construction a value equal, if not decidedly superior to European timber. Prof. Thurston concludes, from extended studies of the subject, that the strength of timber is so variable, that the only safe course in construction is to assume the highest value determined by the most uniform series of tests of the material proposed to be used, and then to adopt a high factor of safety."

Improvement in Locomotives.

There has been, during the last few months, a considerable awakening in the matter of improvements in locomotive construction. We have already made notice of several improvements made and in contemplation, and we now learn that what is considered an important invention in this direction has just been successfully tested on the Delaware and Lackawanna railroad. We find the following report of the trial in the *American Manufacturer*: "A special train, bearing prominent mechanics and capitalists, and drawn by the locomotive named 'Counterpressure,' left Utica at 10 A. M. Oct. 22d, and proceeded to Waterville, 21 miles distant. Here a train of six heavily loaded coal cars was attached, and without the application of a single brake, was taken to Utica. The speed of the train was diminished and stops made on down grades of 70, 80 and 90 ft. per mile, by the use of a lever, the engineer being able thus, unassisted, to slacken the speed of the train at will. The locomotive used is of the ordinary pattern. The power brought to bear against the piston is obtained and controlled by the use of an extra valve in the steam chest. By this steam is had direct from the boiler through a pipe which enters the steam where ordinarily the oil cups are placed. By this arrangement there is no need to reverse the shut-off lever, thereby obviating an immense strain upon the engine which attends the process known to railroad men as 'hauling over.'"

WIRE ROPE TRANSMISSION.—Among the recent improvements in the way of transmitting power for long distances, is the substitution of belts by endless wire ropes running at a high speed. Just where the belt becomes too long for economy there the rope steps in. In place of a flat-faced pulley a narrow sheave, with a deep, flaring groove, is used, the groove being filled out, or lined rather with leather, oakum, India rubber, or some other soft substance, to save the rope. The essential points are a large sheave, running at a considerable velocity, and a light rope. When the distance exceeds 400 ft., a double-grooved wheel is used, and a second endless rope transmits the power 400 ft. further, and so on. The loss by friction is said to be only 8% per mile. If it is required to transmit 300 horse power by means of a wire rope, the size of rope required will be one inch in diameter, running 4,920 ft. per minute over a wheel $14\frac{1}{2}$ ft. in diameter, making 108 revolutions per minute. One is thus enabled, at a small expense, to transmit power in any direction.

How a Ship is Built.

The *modus operandi* of laying out the work for building a ship, or rather for shaping the ship, forms the subject of an article in *Harper's Magazine*. The length, breadth and depth of the vessel having been decided upon, the next step is to make the model, which is done as follows:

A cabinet maker carefully prepares a number of pieces of choice wood of exactly equal thickness—say from four to six inches wide, and from a yard to one and a half yard long. At the same time he selects an equal number of pieces of veneer of the same size, choosing a veneer of a dark color, or color contrasting with the other wood. The boards are carefully laid one over the other, with the veneer between each, and the whole is then glued together to make a solid block. Out of this block the designer shapes a model of one-half of the hull of the ship. He gives the block the exact shape the future ship to assume when seen from the side. Only a half model is made, as the two sides of the ship will be simply duplicates of the model.

The marine architect must combine science with beauty or form, of rather his science must be expressed in a beautiful form. The model must be an exact copy of the ship in little. He must be able to point out how deep the ship will sink in the water; how the bows will part the water in front; how the displaced water may sweep past the sides and under the stern. The model must show how deep the screw will be submerged; how far the ship may heel over under the influence of her sails or the waves in safety; and how she will be upborne from moment to moment on the ever-shifting waves. His art is the careful adjustment of force one against the other, the weight against the flotation or buoyancy, the resistance of the water against the power of her screw and engines, the force of the waves and wind against her own stability. The finished model is full of grace and beauty; but it comes not from the mere blending of sweeping curves and swelling lines, but from the balance of these forces. It is beautiful because the repose of force in equilibrium is always beautiful. Certainly, if the architect is called an artist, the model maker is fully his equal.

A NOVEL RAILWAY DEVICE.—M. Haureg, a French inventor, proposes a method of hoarding railway cars without stopping the train. A "waiting carriage," fitted with a steam engine with special gear, and space for passengers and luggage, is placed on a siding at the station, and picked up by the train as it goes past. The latter, by means of a hook on its last carriage, catches a ring supported on a post, and connected with a cable wound on a drum in the waiting carriage. Thereupon the drum begins to unwind, and in doing so compresses a system of springs, while the carriage is moved at a rate gradually increasing to that of the train. The engine of the carriage then winds in the cable, the train and carriage are connected, passengers are transferred from the joined carriage to the train, and *vice versa*; then the two are disconnected, and the engine of the carriage, working on the wheels, brings it back to the station whence it was taken.

HIGH-SPEED MACHINERY.—The speed of a cutting machine should be regulated by the number of feet per minute traveled over by the cutting face and the quality of the material cut. From 15 to 18 ft. per minute may be allowed for wrought or cast iron, and twice that speed for gun metal, whilst for steel the speed must be reduced in proportion to its hardness. As a rule, these speeds are seldom approximated to, and it thus becomes a matter of serious loss to the engineering manufacturer that a certain coat of plant is not producing its full equivalent of work in a given time. In the same way, with reference to the prime movers or engines, their development of power is exactly proportionate to their speed; indicated horse power being the product of the gross pressure multiplied into the number of feet per minute, through which the resistance is overcome. About 300 ft. piston speed per minute is the average speed for which most commercial engines are designed.

A METALLIC THERMOMETER.—M. Corot, a Frenchman, has brought out a novel thermometer, which is chiefly remarkable for the small space which it occupies, and which renders it particularly suitable for those who need pocket instruments which are not subject to accidental breakage. M. Corot's end to end several concentric tubes of different metals, steel and zinc, for example. By alternating the joints the difference of dilatation are added, so that the last tube, being connected with a toothed wheel or series of levers, gives a great motion to a needle, sufficient to indicate small fractions of a degree of temperature. The metals being good conductors, the indications are rapid when the metallic mass is placed in contact with any body of which the temperature is desired. The tubes can be concentrated in a space of less than an inch.

STEEL FOR BOILER PLATES.—The tensile strength of steel for boiler plates should not greatly exceed 60,000 lbs. per square inch; above 70,000 lbs. the plates are apt to be brittle; below 50,000 lbs. they are likely to be spongy. No plate should be used which, after heating to a cherry red and plunging into cold water, will not allow bending over cold until the sides touch, and without breaking.

SCIENTIFIC PROGRESS.

The Recent Comet.

The spectrum of this comet, known in Europe as Hartwig's comet, from its discoverer, was examined with a spectroscope, at the Royal Observatory, Greenwich, on the evening of Oct. 7th, and was found to consist of three bright bands and a continuous spectrum corresponding to the nucleus. The position of only one of these bands—the middle and brightest—could be ascertained, and that in no very satisfactory manner. The positions of the other bands were not measured at all, owing to the unfavorable nature of the weather, the comet being low and involved in haze and cloud.

The opinion is expressed by Prof. Wincke, of Strassburg, that this comet is identical with one seen Sept. 29th, 1506, and its position roughly described by European observers of that date. Mention is also made of the same comet in Chinese annals of that date. The Professor also remarks that early Chinese observations have been found of much assistance in enabling astronomers of the present century to approximate the orbits of comets. Two appearances, one in 568 and another in 1337, are particularly referred to, in addition to the present one. The Chinese have the record of a very remarkable comet that appeared A. D. 178, which, from the long track it described in the heavens, must have passed very near the earth.

The following paragraph may be interesting as showing the manner in which such observations were placed on record in those early days. The comet described is supposed to have been the one to which attention is now being directed: "As regards European observations of the comet of 1506, Pingre tells us (on the authority of the *Chronicles* which, according to his excellent custom, are named in his margins) that a comet was seen in the month of August in the north, or between the north and east, or lastly between the west and north, and as the comet was not distant from the pole, so that it appeared in the evening after sunset, and in the morning before sunrise, it may have had at different hours of the night the various positions mentioned by the historians. It had a long and bright tail which extended 'between the fore end and hind wheels of the chariot.' On August 8th, a Polish historian, an eye-witness, says it was seen near the pole above 'the seven stars or the stars of the great chariot'; on the following night it was situated amongst the same stars, and later, on several nights, it was seen below them; declining by the sign Cancer, Leo and Virgo, it attained the northern part of the horizon and disappeared on August 14th. Some writers limit its appearance to eight days; others say it was visible for three weeks, or even a month."

The same comet was described in the Chinese annals, and translated by Biot and Williams, as follows: "We read that in the first year of the epoch Ching Tih, in the region of Woo Tsung, on the day Ke Chow of the seventh moon (1506, July 31st), a star was seen to the west without the boundary of Tsze Wei (the circle of perpetual apparition). After some days it had a short tail. It was seen between the sidereal divisions Tsan (determined by *della*, Orionis) and Teing (by *mu*, Geminorum); (the Chinese sidereal divisions, it must be remembered, being intervals of right ascension with wide limits of declination reckoned from the determining star of the division.) It gradually lengthened, extending in a northwesterly direction towards or to Wan Chang (*della*, *upsilon*, *phi*, *Ursæ* Majoris). On August 10th it was bright, and moved to the southeast, it lengthened to about 5° and swept the upper of the stars Hea Tae (*mu*, *xi*, *Ursæ* Majoris), and entered within the space Tae Wei Yuen (Biot's *Thai-Wei*); (a space between stars in Leo and Virgo, to which, as also to Tsze Wei, the circle of perpetual apparition mentioned above, constant reference is made in the Chinese cometary observations.)"

INFLUENCE OF VENUS ON THE EARTH.—Mr. R. G. Jenkins, F. R. A. S., has endeavored to show a very remarkable effect of the planet Venus upon the earth. The present British Astronomer Royal proved, many years ago, that the disturbing effect of this planet was so great that the earth was materially pulled from its orbit. Mr. Jenkins shows that it is to this action that we must look for an explanation of the cold waves, which occur on an average every eight years—as in 1829, 1837, 1845, 1855, 1863, 1871, 1879—and that for the next 40 years the temperature will be below the average. He states that a heat wave has been observed to pass over the earth every 12 years, nearly contemporary with the arrival of the planet Jupiter at its perihelion, such a wave being now close at hand.

MAGNIFYING GLASSES 2,500 YEARS OLD.—In the writings of Confucius, the great Chinese philosopher, the following passage occurs: "As we use a glass to examine the forms of things, so must we study antiquity, in order to understand the present." This sentence points most unmistakably to the use of magnifying glasses long before the time of the writer, who died 478 years before our Era.

Liquefaction of Ozone.

At a recent meeting of the French Academy, M.M. Hautefeuille and Chappuis announced that they had liquefied ozone. These chemists have been able to ozonize oxygen to a greater extent than has hitherto been done, by passing the silent discharge through the oxygen at a low temperature. The tube containing oxygen was immersed in liquid methylic chloride, which boiled at -23°. After being submitted to the electric discharge for 15 minutes at this temperature, the oxygen was conducted into the capillary tube of a Cailletet's apparatus, the temperature of which was maintained at -23°.

After a few strokes of the pump the gas in the tube appeared azure blue; as pressure increased, the depth of color likewise increased, until under a pressure of several atmospheres the ozonized oxygen appeared dark indigo blue. The pressure was increased to 95 atmospheres, and was then suddenly removed, whereupon a mist, indicating liquefaction, appeared in the capillary tube.

The stability of a mixture of oxygen and ozone rich in ozone appears to be chiefly dependent on the temperature. If such a mixture be rapidly compressed at ordinary temperatures, a considerable amount of heat is evolved and the gas explodes.

Ozone, say M.M. Hautefeuille and Chappuis, is therefore to be placed in the category of explosive gases.

Berthelot has shown that the transformation of oxygen into ozone is attended with absorption of heat; the stability of products of endothermic reactions is, as a rule, increased by decreasing temperature.

Ozone is much more easily liquefied than oxygen; the latter must be compressed under 300 atmospheres at about the temperature of -29° before sudden removal of pressure succeeds in producing liquefaction.

We have thus the existence through a large range of temperature and pressure of two allotropic forms of the same element; each with distinctly marked chemical and physical properties. We know that the molecule of oxygen has a simpler structure than that of ozone; the substance of simpler molecular structure is capable of existing through a much more extended range of temperature and pressure than that of more complex structure. Under special physical conditions it seems possible that new allotropic modifications of various elements might be produced.

The marked differences in color and in temperature of liquefaction, between oxygen and ozone, furnish another illustration of the close connection which exists between the "chemical structure" and physical properties of substances; a different "linking," even of similar atoms, being evidently associated with distinctly different physical properties.

M.M. Hautefeuille and Chappuis will doubtless soon be able to furnish more details of the properties of this most interesting substance, liquid ozone.—*Nature*.

ARTIFICIAL CITRIC ACID.—Another brilliant synthesis has recently been accomplished in the domain of organic chemistry; Messrs. Grimaux and Adam have succeeded in building up citric acid from glycerine. Curiously enough, in the last number of the *Berlin Berichte*, Kekule announces that he has been working at the same subject, but by a totally different method. Kekule's work is not sufficiently advanced for him to say positively that his method of synthesis is successful, but he feels justified in saying that very probably the process adopted by him has resulted in the formation of citric acid. *Nature*, from which we clip the above, promises full details of this interesting work in its next issue.

A NOVEL OBSERVATORY.—Prof. Watson, of the Washburn Observatory, in the grounds of the Wisconsin State University at Madison, Wis., is building an observatory of a novel kind. It is generally known that from the bottom of a deep well the stars can be very plainly seen at bright noonday. Upon this principle Prof. Watson is conducting his experiment. A cellar 20 ft. in depth has been sunk below the surface of the ground at the bottom of the slope; over this a fine stone building is erected. At the top of the hill, which is 60 ft. above the bottom of the cellar, powerful reflectors are to be placed, to throw rays of light down a large tube which ends in the cellar, where the observer will be stationed.

THE UTILIZATION OF SAW-DUST.—The sawdust, which has become such a nuisance at Minneapolis and along the river below that growing city, offers a promising field of enterprise for whoever will utilize it. Several applications have already been made of it, and now arrangements are being made by a French manufacturing chemist for the establishment, at Minneapolis, of a laboratory to make from the sawdust an acid, now imported from France, and largely used by dyers, chemists and druggists. It is to be hoped that the enterprise will be successful.

THOUGHT RULES THE WORLD.—It makes no noise, but lives on and reigns when all the hustling and shouting that seemed to stifle it are hushed, and whilst the great works, which it guided the hand of man to do, have either perished or remained to tell of a pomp and vain glory gone forever. Thought is with us in the words of wisdom that "Shall not pass away," and to which we do well to give heed.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Oct. 21.	Week Ending Oct. 25.	Week Ending Nov. 4.	Week Ending Nov. 11.
Alpha.....	4.40	4.41	4.41	23.45
Alta.....	2.60	2.40	2.41	2.70
Andes.....	1.35	1.10	1.05	90c
Argenta.....	25c	20c	20c	20c
Atlantic.....	25c	20c	20c	20c
Aurora Tunnel.....	25c	20c	20c	20c
Baltimore Con.....	25c	20c	20c	20c
Belcher.....	25c	20c	20c	20c
Belmont.....	25c	20c	20c	20c
Best & Belcher.....	11c	9c	8c	8c
Buchanan.....	3.15	2.35	2.35	1.70
Bullion.....	1.60	1.30	1.35	1.15
Bullion Id.....	55c	55c	55c	55c
Bodie.....	3.60	3.15	3.15	3.40
Benton.....	1.20	1.05	1.05	1.20
Bulwer.....	25c	20c	20c	20c
Boyle.....	10c	10c	10c	10c
Black Hawk.....	45c	45c	45c	45c
Belvidere.....	45c	45c	45c	45c
Booker.....	10c	10c	10c	10c
Caledonia.....	2.15	2.10	2.10	2.10
California.....	90c	80c	85c	80c
Challenger.....	2.95	2.60	2.60	2.15
Chollar.....	2.95	2.60	2.60	2.15
Confidence.....	30c	25c	25c	25c
Con Imperial.....	3.10	2.90	2.90	2.60
Con Virginia.....	1.80	1.55	1.55	1.05
Crown Point.....	1.80	1.55	1.55	1.05
Oon Washoe.....	1.05	75c	75c	1.05
Champion.....	1.05	75c	75c	1.05
Concordia.....	1.05	75c	75c	1.05
Dayton.....	1.05	75c	75c	1.05
DeFrees.....	1.05	75c	75c	1.05
Dancy.....	1.05	75c	75c	1.05
Day.....	1.05	75c	75c	1.05
Eureka Con.....	1.55	1.35	1.35	1.20
Excelsior.....	1.55	1.35	1.35	1.20
Endowment.....	1.55	1.35	1.35	1.20
Gen Thomas.....	1.55	1.35	1.35	1.20
Grand Prize.....	1.55	1.35	1.35	1.20
Gila.....	1.55	1.35	1.35	1.20
Golden Chariot.....	1.55	1.35	1.35	1.20
Golden Terra.....	1.55	1.35	1.35	1.20
Goodhead.....	1.55	1.35	1.35	1.20
Gould & Curry.....	1.55	1.35	1.35	1.20
Hale & Norcross.....	1.55	1.35	1.35	1.20
Hillside.....	1.55	1.35	1.35	1.20
Highbridge.....	1.55	1.35	1.35	1.20
Homestead.....	1.55	1.35	1.35	1.20
Hunsay.....	1.55	1.35	1.35	1.20
Independence.....	1.55	1.35	1.35	1.20
Julia.....	1.55	1.35	1.35	1.20
Justice.....	1.55	1.35	1.35	1.20
Jackson.....	1.55	1.35	1.35	1.20
Joe Bates.....	1.55	1.35	1.35	1.20
K K Con.....	1.55	1.35	1.35	1.20
Kentucky.....	1.55	1.35	1.35	1.20
Kossuth.....	1.55	1.35	1.35	1.20
Keystone.....	1.55	1.35	1.35	1.20
Lady Bryan.....	1.55	1.35	1.35	1.20
Lady Wash.....	1.55	1.35	1.35	1.20
Leopard.....	1.55	1.35	1.35	1.20
Levathian.....	1.55	1.35	1.35	1.20
Leeds.....	1.55	1.35	1.35	1.20
Lee.....	1.55	1.35	1.35	1.20
May Belle.....	1.55	1.35	1.35	1.20
Modoc.....	1.55	1.35	1.35	1.20
Manhattan.....	1.55	1.35	1.35	1.20
Martin White.....	1.55	1.35	1.35	1.20
McClinton.....	1.55	1.35	1.35	1.20
Meadow Valley.....	1.55	1.35	1.35	1.20
Mexican.....	1.55	1.35	1.35	1.20
Hides.....	1.55	1.35	1.35	1.20
Morning Star.....	1.55	1.35	1.35	1.20
North Con Virginia.....	1.55	1.35	1.35	1.20
New York.....	1.55	1.35	1.35	1.20
Northern Belle.....	1.55	1.35	1.35	1.20
New Coso.....	1.55	1.35	1.35	1.20
Navajo.....	1.55	1.35	1.35	1.20
Oceidental.....	1.55	1.35	1.35	1.20
Ophir.....	1.55	1.35	1.35	1.20
Oriental.....	1.55	1.35	1.35	1.20
Overman.....	1.55	1.35	1.35	1.20
Panther.....	1.55	1.35	1.35	1.20
Phenix.....	1.55	1.35	1.35	1.20
Phil Sheridan.....	1.55	1.35	1.35	1.20
Potosi.....	1.55	1.35	1.35	1.20
Prospect.....	1.55	1.35	1.35	1.20
Raymond & Ely.....	1.55	1.35	1.35	1.20
Richer.....	1.55	1.35	1.35	1.20
Rock Island.....	1.55	1.35	1.35	1.20
Rye Patch.....	1.55	1.35	1.35	1.20
Rough & Ready.....	1.55	1.35	1.35	1.20
Sage.....	1.55	1.35	1.35	1.20
Sag Belcher.....	1.55	1.35	1.35	1.20
Sierra Nevada.....	1.55	1.35	1.35	1.20
Silver Hill.....	1.55	1.35	1.35	1.20
Silver King.....	1.55	1.35	1.35	1.20
Silver Prize.....	1.55	1.35	1.35	1.20
Suocor.....	1.55	1.35	1.35	1.20
Summit.....	1.55	1.35	1.35	1.20
Scorpion.....	1.55	1.35	1.35	1.20
Solid Silver.....	1.55	1.35	1.35	1.20
South Bodie.....	1.55	1.35	1.35	1.20
South Standard.....	1.55	1.35	1.35	1.20
Star.....	1.55	1.35	1.35	1.20
St. Louis.....	1.55	1.35	1.35	1.20
Syndicate.....	1.55	1.35	1.35	1.20
Sierra Nevada.....	1.55	1.35	1.35	1.20
Tiptop.....	1.55	1.35	1.35	1.20
Trojan.....	1.55	1.35	1.35	1.20
Union Con.....	1.55	1.35	1.35	1.20
Utah.....	1.55	1.35	1.35	1.20
Vermont Con.....	1.55	1.35	1.35	1.20
Ward.....	1.55	1.35	1.35	1.20
Wells Fargo.....	1.55	1.35	1.35	1.20
Woodville.....	1.55	1.35	1.35	1.20
White Cloud.....	1.55	1.35	1.35	1.20
Yellow Jacket.....	1.55	1.35	1.35	1.20

Sales at S. F. Stock Exchange.

Thursday A.M., Nov. 11.				
20 Alpha.....	2.90	120	Scorpion.....	1.20
720 Alta.....	4.05	100	Union.....	1.04
280 Andes.....	1.10	100	Yule.....	1.10
200 B & Belcher.....	1.10	100	Yellow Jacket.....	4.45
110 Belcher.....	1.10	100	AFTERNOON SESSION.	
200 Belmont.....	1.10	100	150 Alpha.....	1.10
140 Benton.....	1.10	100	230 Argenta.....	1.10
165 Chollar.....	1.10	100	200 Bechtel.....	1.10
70 California.....	1.10	100	250 Boston.....	1.10
100 Con Imperial.....	1.10	100	200 Booker.....	1.10
130 Confidence.....	1.10	100	70 Con Virginia.....	1.10
200 Crown Point.....	1.10	100	400 Champion.....	1.10
10 Challenge.....	1.10	100	45 Columbus.....	1.10
200 Caledonia.....	1.10	100	500 Eureka Con.....	1.10
230 Gould & Curry.....	1.10	100	400 Goodhead.....	1.10
125 Gould & Curry.....	1.10	100	200 Grand Prize.....	1.10
110 Hale & Norcross.....	1.10	100	250 Jupiter.....	1.10
185 Justice.....	1.10	100	250 Mono.....	1.10
90 Julia.....	1.10	100	100 Manhattan.....	1.10
100 Lady Wash.....	1.10	100	50 Mt. Diablo.....	1.10
210 Mexican.....	1.10	100	50 Mt. White.....	1.10
200 Morning Star.....	1.10	100	150 Mt. Potosi.....	1.10
150 New York.....	1.10	100	100 N. B. L. L. S.....	1.10
35 Overman.....	1.10	100	80 Noonday.....	1.10
220 Occidental.....	1.10	100	60 Navajo.....	1.10
335 Ophir.....	1.10	100	300 Oro.....	1.10
170 Potosi.....	1.10	100	100 Tioga Con.....	1.10
350 Savage.....	1.10	100	120 Wadsworth.....	1.10
315 Silver Hill.....	1.10	100	120 Wadsworth.....	1.10

BUSINESS on the Union Pacific is so heavy that for some time the orders for freight cars in a single day have been nearly 2,000 more than could be supplied. Nearly all the railways are now working to the full limit of their equipment, and many have to decline offered business. What a time to inaugurate a war of rates, and throw money away.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ. NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co	Nevada	13	100	Oct 27	Nov 30	Wm Willis
Albion Con M Co	Nevada	4	25	Sept 29	Nov 3	T B Chisholm
Belcher S M Co	Nevada	25	75	Nov 3	Dec 27	J Crockett
Black Hawk G M Co	Cal	10	10	Nov 10	Dec 15	H A Charles
Benton Con M Co	Nev	13	100	Oct 27	Nov 30	Wm Willis
East & Belcher M Co	Nev	19	50	Nov 13	Dec 15	Wm Willis
Champion M & M Co	Cal	8	25	Oct 4	Nov 9	John Crockett
Caledonia M Co	Dakota	9	80	Oct 2	Nov 11	D F Verdenal
Caledonia S M Co	Nevada	32	25	Sept 14	Oct 20	R Wegener
Con Imperial M Co	Cal	13	10	Nov 3	Dec 8	W E Dean
Crown Point G & S M Co	Nev	43	30	Oct 7	Nov 18	James Newlands
Chollar M Co	Nev	5	50	Nov 9	Dec 14	W E Dean
Bullion Creek Hydraulic M Co	California	6	15	Sept 12	Oct 27	R L Taylor
Excelsior M Co	Nevada	16	05	Oct 7	Nov 10	C E Elliott
Hale & Norcross M Co	Nev	23	10	Oct 13	Nov 17	J H Griffiths
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	C Van Dyke Hubbard
Martin White M Co	Nevada	7	50	Sept 4	Oct 24	J J Scoville
Maryland Con G & S M Co	Cal	2	15	Aug 10	Sept 15	E P Farnsworth
Mexican M Co	Cal	13	100	Sept 23	Oct 28	C L McCoy
Mammoth M Co	Cal	3	10	Nov 3	Dec 6	A W Rose, Jr
Monterio Christo M Co	Cal	4	10	Sept 21	Nov 1	B Burris
Mono G M Co	Cal	9	50	Oct 13	Nov 19	W H Lent
New York M Co	Cal	24	15	Oct 11	Nov 13	D L Thomas
Occidental Con G M Co	Cal	5	10	Oct 13	Nov 20	W T Smith
Ophir S M Co	Nev	33	100	Nov 5	Dec 10	C L McCoy
Savage M Co	Nevada	44	100	Oct 4	Nov 5	E P Holmes
San Francisco Copper M Co	Cal	6	50	Sept 15	Oct 15	R H Pond
Tellurium G & S M Co	Cal	23	10	Oct 17	Nov 17	J M Litchfield
Yellow Jacket M Co	Nev	39	100	Oct 5	Nov 10	Mercer Otley

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Arizona Prospecting & M Co	Arizona	2	05	Oct 8	Dec 2
Armad G & S M Co	Cal	2	02	Oct 21	Nov 30
Buckeye W & H M Co	Cal	3	20	Nov 4	Dec 11
Eureka Con M Co	Cal	26	15	Oct 13	Nov 15
California G M Co	Cal	50	05	Nov 9	Nov 30
Cahore M Co	Mexico	2	20	Oct 13	Nov 17
Commonwealth Con M Co	Cal	3	10	Oct 9	Nov 12
Cumberland G & S M Co	Arizona	2	30	Oct 27	Nov 30
Dag S M Co	Nevada	7	15	Sept 23	Oct 25
Excelsior G M Co	Cal	13	10	Oct 20	Nov 4
Godfrey G M Co	California	5	05	Sept 4	Nov 4
Hazard G M Co	Cal	5	07	Sept 27	Nov 4
Iowa M Co	Cal	17	20	Oct 12	Nov 15
Mt Potosi Cons M Co	Nevada	5	25	Oct 12	Nov 15
Maryland Con G & S M Co	Cal	2	25	Aug 10	Nov 30
Mono G M Co	Cal	9	50	Oct 13	Nov 19
Real Del Norte M Co	Cal	13	25	Oct 5	Dec 9
Sage M Co	Cal	17	20	Oct 12	Nov 15
Tuscarora M & M Co	Nevada	7	15	Oct 30	Dec 4
Wide Awake Prospecting M Co	Cal	11	10	Oct 18	Nov 25
Wyoming & Dakota W Co	Dakota	3	20	Oct 28	Dec 7

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Gipsy Queen G M Co	California	Ellis Edwards	330 Pine st	Annual	Nov 15
Harrington M Co	California	O C Miller	324 Pine st	Annual	Nov 16
Peck M Co	Arizona	C T Bridge	224 California	Annual	Nov 18

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	Sept 15
Golden Terra M Co	Cal	J K Goodrich	309 Montgomery st	25	Sept 21
Grand Prize M Co	Nevada	E M Hall	327 Pine st	25	Sept 8
Indian Queen M Co	Cal	Grove Adams	Merchants' Ex	10	Oct 25
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	10	Oct 30
Northern Bell M & M Co	Cal	Wm Willis	309 Montgomery st	10	Nov 20
Silver King M Co	Arizona	J Nash	315 California st	25	Oct 1
Silver King M Co	Arizona	J Nash	323 Montgomery st	25	Nov 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	Nov 1
Western M Co	California	C S Curtis	309 Montgomery st	75	Sept 7

The Mining Share Market.

There is no special improvement to note in the stock market. The situation remains about the same in most of the mining districts. On the Comstock, since the election, work has been fully resumed at all points, and the *Enterprise* says:

Some changes worthy of note will probably soon be seen at the north end, where winze No. 1, in the Union Consolidated ground, has reached quartz that is almost good enough to be called ore. It is expected that an east drift from the bottom of this winze will develop paying ore, as the whole formation at that point appears to be making to the eastward. In the Ophir and Mexican mines they are still running connecting drifts and winzes and doing other work that is preparatory to prospecting. In the middle mines the main south drift on the 2,400 level of the Chollar has been pushed into Potosi ground. At this point there is a great area of ground that has never yet been explored. This reaches up to and in many places far above 1,900 level.

The Belcher folks are prospecting both

THE Downes mill, Amador county, is completed.

The Remedy for the Phylloxera.—No. 2.
[Written for the PRESS by J. H. WHEELER.]

Having given in article No. 1 (in SCIENTIFIC PRESS of Nov. 6th) the position which the bisulphide of carbon occupies as an insecticide; having alluded to the manner in which it has superseded all other remedies for the phylloxera, and also to the manner in which M. Marion opens the *Rapport du Comité Regionale*, I will now proceed to examine the first part of the report, consisting of an exposition of the experimental work of the *Comité* in 1877.

Chapter I. gives a biographical sketch of this insect. In order to operate on the phylloxera, its changes must be known. The result of the *Comité*, in following its metamorphoses, corresponds closely to that given by Prof. Hilgard, of the University of California; it is, briefly, as follows: The insects are to be found safely ensconced on the roots of the vines during the months of December, January, February and March. These months make up the period of their hibernation. If the climate be exceedingly cold they hibernate in the egg; but in countries like France and California, the tendency is to winter without change of form. The insect then continues during this period in a torpor, from which they awake during the first part of April. Then begins their parthenogenesis; if the weather be cold they do not pronounce their eggs until the middle of the month. The new generation of insects are attached to the roots, and continue to reproduce without sexual inter-

climatic changes of California will render it necessary to apply it about the last of December, or in January—but here arises the difficulty of plowing—it cannot be put into the ground after the soil has been agitated or worked.

Chapter II. treats of experiments to determine the diffusion of the bisulphide of carbon in the soil. For, understanding this, suppose 5 or 20 grams of liquid bisulphide be placed in the soil by the proper instrument. It immediately begins to diffuse; if the soil be warm and loose, the diffusion is rapid, if cold and compact, less rapid. Now we want to know how far the vapor penetrates the soil from the point of insertion; how long, after insertion, it is before the liquid is all evaporated, and also its toxic strength at different distances from the point of injection, and at different times afterwards. To determine this an apparatus is constructed, consisting of an aspirator attached to a tube with holes in its lower end; this tube being inserted into the ground, the aspirator is set to drawing in the atmosphere which surrounds the tube underground, this atmosphere being drawn through a strong solution of potassium in alcohol. If there be any of the gas of bisulphide of carbon in this atmosphere which is drawn from underground, it forms with the solution of potassium the xanthate of potassium (thus $CS_2 + (C_2H_5)_2KO = (C_2H_5)_2KCO_2S_2$). This xanthate of potassium, on being neutralized with acetic acid, gives, with a drop of the sulphate of copper, a bright yellow precipitate, thus forming the xanthate of copper. Now, by the density of this precipitate, the strength of the toxic atmosphere can be approximately determined from the point at which the tube is inserted.

The results of two of these experiments I

times of year. In a compact clay soil it was found that in March the vapor continued sufficiently effective for seven and one-half days, and from that on its presence was scarcely noticeable more than 25 c. m. from the point of injection. In a loose soil at the same time the vapor continued effective only six and one-half days. In the month of April, the same two soils were tried again and the results gave six and one-half days in the compact soil, and five and one-half days in the loose soil.

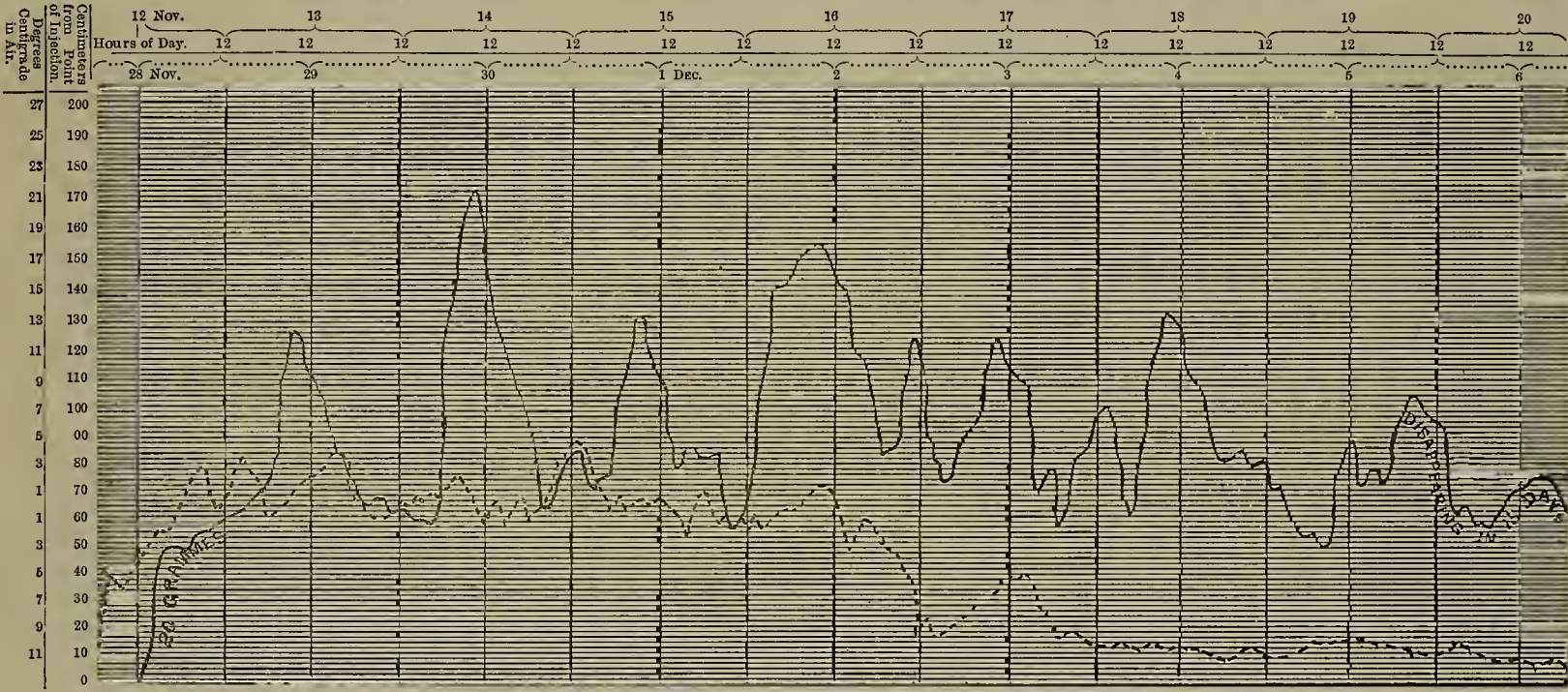
The humidity of the soil is another important element, excessive moisture retarding the diffusion and giving it longer time to operate. It is seen by the curve that the energy of the vapor is not directly proportional to the amount injected nor is the distance it traverses; in this case the proportion in quantity injected being that of one-fourth and the distance or energy of the vapor nearly one-half, and from this we are able to economize, and also to determine, when there are to be two successive applications, how soon the one must follow the other, which as we have stated, is an interval of six days in winter and four days in summer.

Thus far we have spoken only of the horizontal diffusion of the vapors. In these experiments the liquid was inserted about 40 c. m. or nearly 16 inches; below the surface the passage of the vapor is downward, and laterally into the ground. The rate of diffusion with all gases is inversely proportional as to the square of their density. Now the density of bisulphide vapor being very great, its diffusion is comparatively slow; in fact, it is because of its superior specific gravity that it is so valuable for this purpose. It is on this account that it is so successfully applied to the killing of squirrels, for

proceed as follows: A large number of wire cloth nets are made cylindrical in shape, and 12½ inches in length. Into these are carefully placed roots taken from the vine, placing a number of lengths (on which a uniform amount of phylloxera are attached) into each. A large number of the nets being thus prepared, they are, after each has been attached to a wire, to which is fastened a numbers tag, placed underground at a depth of about two ft., and being planted at measured distances from each other, we have to all intents and purposes a vineyard hadly phylloxered. It gives, when the earth is carefully placed about the nets, the normal condition of the insect, and yet perfectly under our control. A few days are allowed to elapse before applying the reagents, in order to make the conditions perfectly natural; then the bisulphide is injected at different distances from the nets, and in different quantities—not to a single net, but to a field of from 100 to 150 nets is each experiment applied.

One trial may be with these constructive vines six ft. apart; another with them four ft. apart, and so on, thus obtaining results which may apply to the different vineyards. After a proper interval succeeding the application of the insecticide, the nets are removed and examined, and the per cent. killed determined—the numbering and classifying by tags before being placed in the ground conducing to great accuracy.

In this chapter, after the presentation of the above scheme for determining the mortality of the insects under experiment, there follows a report of the results obtained. These cannot be given here, but a few facts may be added, illustrating the general results, as follows:



CURVE REPRESENTING THE DIFFUSION OF BISULPHIDE OF CARBON AS DETERMINED BY FRENCH EXPERIMENTS.

course until about the 20th of July, after which, little stumpy wings appear, and with them they fly forth to the leaves. Until September they continue to swarm above ground, and have even been found above ground as late as the 14th of Oct. The winged insects, which appear about the 20th of July, inhabit the leaves, and by their sting raise a gall which grows up and surrounds them; each insect in the meantime lays from 100 to 200 eggs, and then dies in the gall. From these eggs a wingless lice are brought forth, which feed on the leaf and reproduce without sexual intercourse. Here for the first time appear the males and females, and during the following period their union is active. Now the female lays a single egg from which, in September, the mother root-lice is produced. Again descending to the roots of the vine, the cycle is repeated similarly the next year. If the vine be one not suitable to the above ground life of the insect, it may continue for eight or ten generations to reproduce underground. Its metamorphosis is also influenced by the weather, occasionally skipping some intermediate stage of its successive development to conform to its environments.

The change which the phylloxera undergo in California are probably similar to those which they undergo in France; but we see that some particular stage may be left out, and still the following phases be the same. We do not seem to have the winged variety as numerous as in France; but of this we are certain, that they do infest the roots, and that they hibernate without the egg. This renders them available to the winter application of the bisulphide, which might allow them to survive if they were to hibernate in the egg. The State Commission will tell us how closely the California phylloxera follows in its habits that of France and other countries, after they determine the same by experiment. Professor Hilgard thinks we shall need to apply the bisulphide later in the year than it is applied in France. That the

have given in the chart which appears on this page. The dotted line gives the diffusion of 5 grams of bisulphide obtained in November and December, 1877; and the continuous line the diffusion of 20 grams, obtained in November, 1877. Distances measured on the horizontal lines indicate the length of time after the injection, and distances measured on vertical lines indicate the distances from the point of injection to which the vapor has penetrated the ground. Thus, if we desire to know how far the vapor from 20 grams has penetrated the soil later after two days or 48 hours, we look under the number 12, indicating midday of the 14th of November, and find by measuring on the scale to the left of the chart marked centimeters, the height to which the line passes at this point. Thus, we have in centimeters the distance desired, which in this case is 170 c. m. or 5 ft. 6.76 inches.

This happens to be its greatest diffusion for 20 grams, but likewise the diffusion can easily be determined for any other time. The state of the atmosphere is also marked by the scale on the extreme left of the chart. To reduce these figures to Fahrenheit degrees, the scale used in this country, multiply by 9-5 and add 32. By this chart we are able to ascertain the distances which the vapors traverse, and also just how long it continues to act—the 5 grams acting 8 days and the 20 grams 15 days. We have, then, the substance under our control, and are certain of so much. The curves, it will be seen, oscillate with the temperature, at midday being highest and increasing with the temperature. The chart from which this was taken exhibits the harmonical pressure at the different periods and also the conformity of the diffusion to the temperature, which I am unable to give here. With the temperature it follows with exactness, but with the harmonical line it varies with great irregularity.

Many other curves were formed by varying the amount, the nature of the soil and the

the vapor flows down a hole much as water would do, so it penetrates all the interstices in the soil and passes downward and outward; a small portion passes upward, but the intensity of this decreased as we approach the surface and unless the amount be very large there is no perceptible loss by passing off from the surface. Many other chemical vapors might be found which would kill the phylloxera, but few, indeed, would serve the purpose of such economy as does the bisulphide of carbon in sinking immediately to the desired spot.

The most favorable depth seems to be about 16 inches, for if nearer the surface there might be an appreciable loss by evaporation, and if deeper the injecting would require other than hand labor. This is a convenient depth, and has been adopted by all experimenters as the best adapted to serve the end desired.

Now I believe we have the vapor under our control, and in determining its toxic effect on the insect, we may proceed intelligently. We know already that it becomes practicable, that it can be made to reach the infested parts, and we know its diffusion. We also know it to be a poisonous vapor, that it kills vermin and insects generally, and even animals, and from this we might infer that it would deal death to the phylloxera; but we are not here proceeding inferentially, but require actual, positive proof of this fact, which we will now proceed to examine in the next chapter, entitled "Determination of the energy of the bisulphide of carbon as an insecticide." The great object here is to get at the normal condition of the phylloxera, that the results of the experiments may extend accurately to the work on a large scale, which the experiments are designed to assist. The plan adopted, therefore, is not to take the insect from the ground and bottle him up in an unnatural condition, nor yet to treat it on the vine as first found, for in this case we should be unable to determine accurately the percentage killed or allowed to survive, but to

On the 18th of October, 1877, 100 nets planted in a gravelly soil, 1 meter (39.27 inches) apart. Treated with bisulphide on the 22nd of October at rate of 16 grams (.0352 lbs.) per tube, or 16 grams per square inch. Each 16 grams was divided and supplied 2 holes on opposite sides of the nets, thus, in the middle, between every 2 vines 8 grams was injected. Temperature of the soil, 19½ C., or 67.1° F.

The result of this was, out of 244 rootlets thus encased, buried and experimented on, only 30, on the 31st of October, nine days after the application of the bisulphide, had any of the phylloxera yet alive on them. From the proportion, then, of 244 : 30, we have, by the simple rule of three, the percentage not exterminated, viz: 12.32, the remaining percentage, we designate the coefficient of the insecticide.

Repeating this treatment after six days effected a complete extermination. A great number of conditions, varying from the above in soil, time of year, distances apart of the nets, etc., were experimented upon, and the following were the most important conclusions arrived at: The work is more satisfactory, and the vapor acts with greater efficiency in a compact soil than in a loose one; a moist condition is more favorable than a dry one; the soil should not be moved or cultivated until at least six days have elapsed after the final application; the quantity of bisulphide should be slightly increased on the margin of the vineyard, or else the application extended to some distance beyond the margin of the plat, as the diffusion is here more rapid, because of there being no tension of neighboring injections to oppose, thus rendering diffusion too rapid. These results can be relied upon as falling within the true estimate of the energy of the vapor, for the roots in their natural ramification approach nearer to the point of injection, and many being lower down than the nets were placed, receive a more marked effect of the vapors, whose toxic strength increases with the depth when reaching no lower than the roots of the vine penetrate.

It is by the above-mentioned experiments

also, that it was determined, as stated in my first article, that if a single application is relied upon, it must be 55 grams per square meter—such figures as 40 grams and 37 grams can never be relied upon; that if extended to two applications, however, a total of 23 to 32 grams per square meter, or 15 or 16 grams per square meter, injected each time, the second, after an interval of six days in winter, and four days in summer, is sufficient, each of these 16 grams being placed in 2 holes of 8 grams each. In connection with these experiments with the bisulphide of carbon, a number of trials were made with the mixtures of bisulphide, with heavy and green oils of anthracene, such as have been introduced for insecticides. In all these cases it has appeared that a slight additional amount of bisulphide was required to effect the results obtained by the bisulphide alone, besides the amount of oil or other substances with which it was mixed, the oil increasing the diffusion at first and retarding it afterward. It was proved also that the oil possessed no virtue in itself, and served only as an additional expense.

There remains yet the chapter on the effect of the bisulphide on the vine itself, then a few results of experiments on a large scale and experiences of French viniculturists not on this committee; this will be followed by directions for handling of bisulphide, estimates of expense of using it and cost at which it will be furnished from the manufactory on this coast.

Bodie District.

Whoever thinks that Bodie has seen its best days is but poorly informed of the satisfactory condition of things—not in the stock market, but in the lower workings of the mines of Bodie district at the present time. The *Free Press* has never been and cannot fairly be accused of extravagant statements in relation to individual mining properties. Had it been less careful in its statements and conclusions at certain times, it might possibly have been more to the interest of its publishers, in a certain sense, but it could hardly have enjoyed at the same time the reputation for integrity and evident desire to avoid leading the public into unsafe investments that it does to-day. The writer can say without reserve, and with an intimate knowledge of the mines of Bodie district since April, 1878, which has been interrupted but by two weeks absence in that entire period, that there never has been a time when the camp looked so substantial, when so many mines could show rich ore, and when there was such assurance that they would continue to great depth, as at present. The Bodie has as good a showing at a vertical depth of 600 ft. as it ever had above. Six hundred ft. in the Bodie or Jupiter are equivalent to about 700 in the Standard. Why should not the Standard have rich ore in the 700, or if it has not—which is not conceded—why should that fact be depressing, if there is rich ore 200 ft. south of the Standard, at the same depth? High peak and Bodie bluff can take care of themselves, and will have paying mines for years to come. But outside the hitherto producing portions of the district comes a new candidate for public favor, and one that gives promise of doing greater things than have been done by the old Peak—that is, Silver hill. A wonderful silver ledge runs through that hill. It was first discovered in the Addenda and then in the Oro; it has been traced in the Dudley, and now, at a deeper point than in any of the others, and relatively more compact and rich, it is in course of development in the Concordia. That it will be found in the Queen Bee Hill mines is every way probable, the University formation at its lowest workings being identical with that in the other mines named. Now here is a ledge traced for 2,500 ft., in what all old Comstockers pronounce an immense "formation," and which is exceedingly rich at a great number of different points, and which shows a most remarkable improvement every time it is struck at increased depth. Its development has heretofore been hampered with water; but the magnificent working of the Red Cloud, the expense of which is being borne in equal proportions by seven adjacent mines, will soon render that a question of the past. The Noonday ledge, it should be recollected, is a separate proposition, several hundred ft. west of the Concordia ledge. The best feature of the work at the south end is that it is in the hands of men who have the financial ability to carry out the very extensive work now under way, and who are thoroughly justified in the outlay they are making by the ore almost in sight.

MINING STRIKES.—To some it may seem strange that the most important discoveries are made late in the summer; but if they will only remember that miners, as a rule, do not begin to work on their prospects till the summer has fairly set in, the matter will be somewhat clearer. All prospectors are not well fixed financially, and those who strike out for a season's prospecting find themselves short of funds in the fall, if not in debt. They seek employment for the winter in some of the paying mines, and when the snows have disappeared, are ready to try again. The prospects located the summer before are worked on. Assessment work being done, a consultation is held and all work is then concentrated on the prospect that looks the most promising. It takes time to sink shafts and run prospecting drifts; and when the snow begins to fly, happy is he who can say "I've struck it."—*Salt Lake Tribune.*

USEFUL INFORMATION.

How to Preserve a Carriage.

Mr. Starey, a prominent carriage manufacturer, of Nottingham, England, in a series of useful hints on their preservation, says that a carriage should be kept in a tight coach house, with a moderate amount of light, otherwise the colors will be destroyed. There should be no communication between the stables and the coach house. The manure heap or pit should also be kept as far away as possible. Ammonia cracks varnish and fades the colors both of painting and lining. A carriage should never, under any circumstances, be put away dirty. In washing a carriage, keep out of the sun, and have the lever end of the "setts" covered with leather. Use plenty of water, which apply (where practicable) with a hose or syringe, taking care that the water is not driven into the body to the injury of the lining. When forced water is not attainable, use for the body a large soft sponge. This, when saturated, squeeze over the panels, and by the flow down of the water the dirt will soften and harmlessly run off, then finishing with a soft chamois leather and oil silk handkerchief. The same remarks apply to the underworks and wheels, except that when the mud is well soaked, a soft mop, free from any hard substances in the head, may be used. Never use a "spoke brush," which, in conjunction with the grit from the road, acts like sandpaper on the varnish, scratching it, and of course effectually removing all gloss. Never allow water to dry itself on the carriage, as it invariably leaves stains. Be careful to grease the bearings of the fore-carriage so as to allow it to turn freely. Examine a carriage occasionally, and whenever a bolt or slip appears to be getting loose, tighten it up with a wrench, and always have little repairs done at once. Never draw out or pack a carriage into a coach house with the horses attached, as more accidents occur from this than from any other cause. Top carriages should never stand with the top down, and aprons of every kind should be frequently unfolded or they will soon spoil.

DON'T BLOW INTO YOUR WATCH.—A correspondent of a German paper calls attention to the injudicious practice of blowing dust off of the watchwork. He says that the operation looks so harmless that but few ever think of the destructive consequences attendant on the contact of humid breath with polished steel surfaces and springs. At lower temperatures a kind of veil covers the parts at once after blowing, which gradually disappears again, but it is in fact nothing else than a watery deposit, or steam reduced to water. Generally the deposit evaporates as the object gets warmer, but this is not always the case. Many watchmakers are sometimes dotted over, apparently with particles of dust, which on closer examination are found to be rust. Perhaps many have been puzzled to account for rust spots between the coils of a spring, very minute, but still sufficient to render the article useless. These serious defects, says our authority, may in most cases be put down to the evil influence of warm breath, microscopic particles of water, for want of sufficient heat to evaporate, having remained on the surfaces and done the mischief described.

THREAD FROM WOOD.—The manufacture of thread from wood for crochet and sewing purposes has, it is said, recently been started at the Aby cotton mill, near the town of Norköping, in the middle of Sweden. The manufacture has arrived at such a state of perfection that it can produce, at a much lower price, thread of as fine quality as "Clark's," and has, from this circumstance, been called thread "à la Clark." It is wound in hells by machinery, either by hand or steam, which, with the labeling, takes one minute twelve seconds, and the balls are packed up in card-board boxes, generally ten in a box. Plenty of orders from all parts of Sweden have come in, but as the works are not yet in proper order, there has hardly been time to complete them all. The production gives fair promise of success, and it is expected to be very important for home consumption.

TO MAKE GOOD VINEGAR.—Some one asks the *Phrenological Journal* why it is so difficult to get good cider vinegar now-a-days. The editor replies as follows: "The main reason is that genuine cider vinegar can't be made in a hurry. A good article of cider will be two or three years in becoming vinegar, unless kept at a high temperature, when a few months may suffice. The larger portion of that sold as cider vinegar is as innocent of apple juice as possible. Better not use the sour stuff anyway; but eat fruit which will supply a form of acid more suitable to your stomach."

LOBSTERS are cultivated in a salt water pond on the New England coast. The pond covers 30 acres, and is so arranged that the water is partially changed at each tide. The food supply consists of refuse from the Boston fish markets, and during the first year 15,000 marketable lobsters were sold.

The Russians keep fish perfectly sweet for a long time in the hottest of weather by dipping them in beeswax, which forms an air-tight covering for them.

Spontaneous Combustion of Charcoal.

Among the substances subject to spontaneous combustion, according to the *Fireman's Journal*, pulverized charcoal is said to be one of the most remarkable. Incidental to this phenomenon a story is told that a load of charcoal was delivered in an outhouse of a clergyman in Leipsic, and showed no signs of burning until the door by accident was left open, when the wind blew sprinklings of snow on the charcoal. The rapid absorption of oxygen from the melting snow caused the charcoal to ignite, and as this day was windy the whole range of buildings was burned to ashes. In this connection a fruitful and unsuspected source of fire suggests itself to those of our American housekeepers who burn wood as fuel, and who store the ashes in boxes or barrels. The accidental disturbing of such ashes, even after years, will cause them to ignite, provided the air is damp or foggy. The phosphuret of potash from decayed wood renders wood ashes highly inflammable, and mysterious cellar fires in the rural districts are, no doubt, in some cases, caused by this form of spontaneous combustion.

NEW USES FOR SAW-DUST.—The *Lumberman* says: We have been shown a model of a car wheel consisting of an iron rim of seven inches outward diameter by one-half inch thick, fitted with a well-proportioned hub, the space between the hub and rim filled with pine saw-dust, pressed in so solidly that we are ready to believe the assertion that resting the iron rim upon bearings, a pressure equal to 23 tons applied to the hub failed to develop any signs of weakness. We hesitate in these days of progress to assert that anything is impossible, and we begin to think that even saw-dust possesses elements of value hitherto unsuspected, and that the day may come when the filled grounds adjacent to all saw-mills may be seen to have a great value in the mechanical development and utilization of the now useless debris placed upon them to get it out of the way. Saw-dust car wheels, saw-dust brick, saw-dust fence posts, railroad ties, and even saw-dust window and door frames, wainscoting and moldings, begin to appear among the possibilities of the immediate future.

GOOD HEALTH.

Curing Disease by Fasting.

It appears that Dr. Tanner is not the first person who has practiced upon the idea of curing disease by fasting. The North Adams, Mass., *Transcript* gives the following: "A propos to the experiment of Dr. Tanner, who, in New York, attempted to live 40 days without food of any kind, the experience of Mr. John F. Arnold, of this town, may be interesting. Mr. Arnold, as is generally known, is a radical upon the subject of health and medicine, and advocates theories which, to the majority of the people, appear dangerous and unwise. His story is in substance as follows: In 1839 he was very ill, and his physicians gave him little hope of permanent recovery. This fact led him to study medicine and the care of himself. About that time Dr. Graham, the well-known founder of the Grahamite system, came here to lecture, and Mr. Arnold attended the lectures and became a thorough convert. He afterward studied books supporting Dr. Graham's views, and from that day to this he has been a consistent believer in the doctor's theory. In 1847 Mr. Arnold studied the books of Dr. Jennings, of Oberlin College, and embraced his theory that disease was not an enemy of the human system, but was simply nature's method of repair, and was right under the circumstances. "The first opportunity to put his theory to practical test was in 1865, when, after a season of hard work, and being thoroughly exhausted, he was prostrated with bilious fever. Dr. Hawkes was summoned, and said that escape from the usual 21 days' sickness was impossible. The doctor called regularly and left his medicines, but Mr. Arnold did not take a drop of them, and allowed no nourishment to pass his lips, except pure water, for 24 days. For over three weeks he existed without a particle of food, and then he began to eat and regain his strength rapidly, increasing 15 lbs. in 18 days. Not until he was entirely cured did he reveal his course to the doctor.

"Again, in 1872, after the fright and exhaustion caused by the burning of the Fifth Avenue hotel in New York, where he was stopping at the time, Mr. Arnold was again prostrated with bilious fever. This time he called Dr. Lawrence, and told him that he intended to fast again during the three weeks of the illness, and the doctor consented to watch the progress of the case. The result was the same as before, Mr. Arnold coming out of the fever stronger than ever, having taken nothing into his system for 24 days except water. Mr. Arnold's theory is that nature, if let to herself, if the system be not broken down by previous excesses, will 'repair the machine' better than if hindered by drugs and medicines and other unnatural things."

It may be remarked in this connection that, while Dr. Tanner commenced his experiment in perfect health, Mr. Arnold was, in both instances, exhausted to begin with; but, in his case, the time of fasting was only about one-half that which Dr. Tanner endured.

The Willow as a Preventive of Malaria.

Mr. Von Lennep, the Swedish Consul, writes from "Mahazik, near Smyrna," to the *London Times*, as follows: "Before the eucalyptus was ever heard of in Asia Minor, I had seen the bark of the willow used as a febrifuge. I had remarked the easy and inexpensive reproduction of this tree, its quick growth in damp places, its excellent qualities for fuel and for agricultural implements, and its great advantages for strengthening the banks of capricious streams, and had thence taken every opportunity after the winter floods to stick willow cuttings along the banks of streams and in other damp places in my property; also to scatter plane-tree seeds in marshy spots. The result has been that, whereas 20 years ago the full-grown trees in this neighborhood might have been counted, a luxurious growth of willows and plane-trees marks my place, fuel is abundant, fever is steadily decreasing, the malarial propensities of the streams are checked, my neighbors have to come to me for agricultural implements, and I have not had to go for timber for rough purposes."

It may be interesting to observe in this connection that the comparatively new but well-known antiseptic preparation known as soliceine is derived from the bark of a certain species of the willow. It is of a pure, bitter taste and highly febrifuge in quality. It is largely used in various solutions, in surgical operations, and is the most effectual preventive of putrefaction in the system known.

Constipation.

It is doubtful if consumption numbers as many victims as are stricken down by the various diseases that result from habitual constipation. True constipation is an inherited disease. It may remain always dormant, but when aroused to action, decay commences at a point circumscribed, and gradually extends—unless arrested—until so much of the lungs become involved that vital action ceases. The evils of constipation result from inattention to the calls of nature, and usually commence with children whose habits are not closely looked to by their parents.

The processes of nature are always active while life lasts. When effete matter is retained a moment beyond the time its expulsion is demanded, the system commences its efforts to get rid of it. When the natural egress is checked, the absorbents carry the more fluid portions of the poisonous mass into the circulation, and it becomes diffused throughout the body. The more solid or clay-like portion is forced into the lower rectums where it becomes firmly impacted, thus cutting off the circulation in the small blood vessels, causing painful engorgement known as piles and hemorrhoids. A continuance of these troubles often results in fissure, fistula, or cancer. The trouble is seldom confined here. As a result of the blood poisoning we almost invariably find more or less dyspepsia, with decided derangement of the functions of the heart, liver and kidneys, accompanied by headache and nervous debility, often verging on paralysis. —*Hall's Journal of Health.*

THE SLEEP DISEASE.—Mr. Talmy has presented a note to the French Academy in which he calls attention to the analogy which exists between the "sleep disease" and chicken cholera. The sleep disease (*melanra*) is a rare affection which, up to the present time, has been met with only among the negroes of the west coast of Africa. It was first made known by English physicians in 1819, but was not accurately observed till many years afterward (1862 *et seq.*) by the French physicians, Danguais, Nicolas, Guerin, and very recently by Corré. In this curious affection the person attacked keeps his eyes half closed, as if he were unable to open them wide, and is frequently seized with a profound desire to sleep. Later on he sleeps continuously, and has to be awakened to take nourishment—which he does with pleasure if he is awakened sufficiently. Death approaches very gradually but surely, and the victim passes away at length without suffering any pain. The disease is always fatal, no cure yet being known for it. From the symptoms as given by the above mentioned physicians, and from the symptoms of chicken cholera as studied by Moritz, Perroncito, Toussaint, and more recently by Pasteur, M. Talmy believes that the two diseases are of a similar character, and both due to a like cause.

SMOKING IN GERMANY.—It appears that the German government has taken the matter of smoking seriously in hand, the practice being carried to so great an excess by the youth of that nation that it has been considered to have damaged their constitutions and incapacitated them for the defence of their country. In certain towns of Germany, therefore, the police have had orders to forbid all lads under 16 years of age to smoke in the streets, and to punish the offence by fine and imprisonment. Moreover, a Belgian physician has ascertained, during a journey of observation and inquiry made at the request of the Belgian government, that the very general and excessive use of tobacco is the main cause of color blindness, an affection which has occasioned very considerable anxiety, both in Belgium and Germany, from its influence upon railway and other accidents, and also from the military point of view.



W. B. EWER.....SENIOR EDITOR.

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The Week.

Now that the election is over, there is a very general tendency on the part of everybody to tall everybody else to go to work in earnest, and help make good times. The advice is very good, and in the mining sections there is an evident desire to follow it. At present, on this coast, times are hard. East of the mountains they are lively. Our turn will come again before long, however, and we should all help it coming.

In this latitude the weather continues warm and pleasant, with no present indications of rain. The health of our city certainly is not good, just now, but the "small-pox scare" is over, being quickly stamped out by very general vaccination.

Our first cool, frosty nights occurred this week; the only indications so far of approaching winter, aside from the shortening days.

There is no special mining news to note, other than is given in our "Mining Summary," in other columns of this issue. Utah seems to be coming to the front as a steady and pretty large bullion producer, and at the end of the year will perhaps surprise some of us at her aggregate yield.

The Forest City Free Press says: Monday night last the locomotive was bringing 19 loaded cars out of the Bald Mountain mine when on the "little grade," about a quarter of a mile from the mouth of the tunnel, one of the connecting chains broke and 14 of the cars got away. They came out of the tunnel like a shot out of a cannon, swept around the curve in the rear of Redmond's saloon at a frightful rate of speed and piled up in the dump. Six of them were hopelessly wrecked.

A CORRESPONDENT writes us from Tucson, Arizona, that the mines are all looking well and new ones coming to the front every week. "Capital is here and more coming. The weather is delightful."

Mining Engineers.

The title of Mining Engineer is conferred by a school of science, indicating that the student has pursued a full course of mining engineering, and has graduated creditably. It is just the same as M. D., Ph. B., A. B., etc., in this respect. But as we see a good many add the M. D. to their names who are mere quacks, so also are there many with an M. E. who are just as much quacks.

Nobody is entitled to the name who has not had it conferred upon him by a legitimate institution. He may call himself an assayer, surveyor, or expert, if he chooses, but, legitimately, not mining engineer. The medical profession jealously guards its title, and makes it hot for those who wrongfully assume it when possible. The mining engineers, however, let the quacks in their line go, thinking their employers are sufficiently punished from the mere fact of employing them.

In reality there are very few mining engineers, and the present number is not annually increased to any material extent. Our own American colleges having mining schools are the University of California; School of Mines, Columbia College, New York; Rensselaer Polytechnic School, Troy, N. Y. There are also the Lawrence School, Harvard College; Stevens' Institute of Technology, Hoboken; Sheffield School, Yale College, and a few others of less importance. The graduating classes at any of these institutions are exceedingly small, the largest only turning out half a dozen or less a year. The foreign schools do not send us very many mining engineers, but they usually send pretty thorough ones.

There is no doubt that we need more good mining engineers than we have, as there is always a demand for men of thorough practical education and skill to conduct our mines. These men should be encouraged in every way to come among us. But this is no reason why every assayer, superintendent, foreman or mineral surveyor who chooses should take to himself the suffix M. E. Those who do are sure to misrepresent the profession, and it is this fact which has frequently brought discredit on a useful and highly cultivated class.

We have seen reports on mines from self-styled mining engineers that were perfect curiosities of illiteracy and pseudo-science, abounding in recklessly applied geological and mineralogical terms, and written without any regard whatever to the rules of grammar. The presence of bad spelling and garbled scientific phraseology in a report is in itself sufficient evidence that the writer is destitute of thorough scientific training, since it is a moral possibility that any graduate of a respectable school should fail in the rudimentary branches of education. We saw, not many months since, a manuscript report on a mining property in this State, signed with the writer's name and M. E. after it, and on the first page was a photograph of its author. This was surrounded with flourishes without number, and was evidently intended to embellish the report. It preceded the diagrams and sections, which were well drawn, but the photograph was apparently of more importance in this "mining engineer's" opinion. It advertised him.

First-class mining engineers receive high pay for their services, and it is this which causes so many imitations. The spurious article reaches its level in time, but is apt to do great harm before this downfall occurs.

NEW MAP OF BODIE.—We have received from Messrs. Anderson & Eysen, a very large, new and complete map of Bodie District. Making the envelope and compiling the data for this map have, we are informed, occupied some two years. All the claims have been surveyed and properly placed, the map having been made for no particular companies. It is seldom we see so much painstaking to produce so complete and illustrative a map, conveying, as it does, so much to the eye at once. Around the map is a series of views of the more prominent mines, and one general view of the district. There are 29 of these sketches, all of them very well executed. As far as we have seen this is the most complete mining district map which has been published here. It will soon be for sale by Payot, Upham, & Co., but at present Ernest G. Moss, No. 11 Geary street is agent, and to him applications for the map may be addressed. Accompanying the map is a small pamphlet giving the date of location and record of each claim represented.

A NEW REGULATION.—Applicants for desert lands, the Register and Receiver as now directed, shall publish for 30 days a notice describing the land and naming the time and place at which he will submit proof as to the agricultural character thereof. The Register and Receiver will also post a notice in their office for the same period. When the claimant shall appear to exhibit proof the Register and Receiver will require him to furnish the affidavit of the publisher of the newspaper in which the notice was published showing that the same was published for the period required. Should no mineral claimant appear the Register and Receiver will receive the ordinary non-mineral affidavit; should mineral claimants appear the Register and Receiver will proceed to order a hearing.

The State Mining Bureau.

All persons from the interior and interested in mining, when they come to this city should not fail to visit the rooms of the State Mining Bureau, 313 Pine street between Montgomery and Sansome. The rooms are only half a block from the office of the MINING and SCIENTIFIC PRESS. As our readers know by previous articles in this journal, the State Mining Bureau was a creation of the last Legislature, and formed under an act introduced by Joseph Wasson, of Mono county.

The State Mineralogist, Henry G. Hanks, has succeeded, in a short time, in collecting a comparatively large amount of material for the museum. The specimens of rocks, ores, minerals, etc., are all duly identified, classified and labeled, and neatly arranged in convenient cases for exhibition and examination already, although the Bureau was only organized for work in June. The collection is larger than any ever before brought together in this city, and it is constantly increasing. Mr. Hanks has devoted many years' time to collecting minerals on this coast, and is familiar with all the localities where they may be obtained.

There have been collected also, a large number of maps of different sections of the State, and a great deal of other material, which will be found of interest to the mining community. Mr. Hanks will from time to time add to the stock of books until a complete mining and metallurgical library will be formed.

The Bureau began with a good donation of ores, rocks, fossils, reports, books, etc., from the State Geological Society. Since then additions to all the departments have been constantly made.

Mr. Hanks will publish an official report next year in which will be found a large mass of information now being collected by competent assistants in the employment of the Bureau. This will cover a good deal of ground, but will naturally be more particularly applicable to the conditions existing in California. It will embrace a history of mining in this State, descriptions of the metallurgical process, the mining and metallurgical machinery, system of quartz and gravel mining, and kindred subjects.

The co-operation of the public is of course necessary to make the Bureau instructive and attractive, and specimens of ore and minerals will be gratefully received. Visitors will be surprised to find how much of a "show" the new Bureau makes, in view of the fact that it was so lately organized.

NEWS FROM TOMBSTONE, ARIZONA.—A dispatch from Tombstone, Arizona, recently, says the mines are looking first-rate. The Toughnut has made a big strike in the northwest shaft. This morning Contention broke into a good ore body on the 400 level. The Grand Central is still improving. The strike in the Girard improves with every foot of progress. The Head Center and Sulphurett continue to develop most favorably. In the Empira the mine commenced recently to cross to the ledge from the bottom of the main shaft, which is now down 450 ft., being the deepest shaft in the district. The simple fact is that the principal mines of this district are in excellent condition, and never looked so well as they do to-day. The question of title to town lots in Tombstone is at present exciting much interest here. The matter is a complicated one, and may result in serious difficulty. A company composed of J. R. Clark, M. Grey, J. D. Rouse, and J. Palmer, made the entry of a town site. The patent therefor has been issued and is daily expected here. Under this patent the aforesaid company claims title to all the town lots, occupied and unoccupied, not heretofore disposed of by them. The possibility of fraud in this matter has been hinted to many times, and it is now charged that the title claimed by the aforesaid company could have been obtained by fraud only. The *Epitaph* has published a two-column article exposing the whole scheme.

GO DOWN.—In a letter to the Salt Lake Tribune, from Bingham, a correspondent says: Mining matters in Bingham appear to be awakening from their dormant condition and affairs are assuming more of a business activity than has been seen during the past summer. More enquiries are being made after mines, and there is a strong feeling to purchase. Several good pieces of property are likely to change owners, and the coming winter may see property that has lain idle for some time start up under a new regime. The question of the pyrite belt appears to be somewhat of a mastodon; none of our mine owners dare to encounter it, they either lack pluck or are afraid to put the question to the test to win or lose it all. It is an old saying among Cornish miners that "Mandic rides a fine horse," and if some of our wealthy mine owners, instead of gophering and scratching on the surface would tackle this momentous doubt, they would be somewhat astonished if they struck ore beneath the belt that would bring them in millions for their small outlay.

Our silver product for the fiscal year ending June 30, 1880, was about \$38,000,000, or \$2,000,000 less than for the previous fiscal year. All but about \$10,000,000 of the product was coined into standard dollars.

Mining Under the Sea.

The only mining ever attempted under the sea on this coast was when efforts were made to pump up the golden sands lying at the bottom of the ocean off Gold Bluff, on our northern coast. This was not successful, however. In England some of the mines have been run out under the ocean. In Northumberland the net available quantity of coal under the sea is estimated at 403,000,000 tons; and on the Durham coast under the sea, including a breadth of three and one-half miles, with an area of 71 square miles, 734,500,000 tons. This latter is said to have an aggregate thickness of 30 ft. distributed in six seams, but how it is to be worked is a problem to be solved in the future, and with respect to which there are and will be many opinions.

As to the coal under water, it has been estimated that the coal will be worked under the sea a distance of three and one-half miles by means of land collieries, and that a further breadth of seven miles may be worked by sinking shafts for ventilating in the sea itself. To what actual distance from the shore coal will be available is a question that cannot be readily answered, as much will depend upon the depth, thickness, absence of faults, as well as the nature of the strata, and the depth of the sea-bottom. The London *Mining Journal* thinks, however, that unless large provision is made for preserving proper means of access to the distant sea coal, vast tracts of the coal in all probability will be lost. It appears to be considered practicable by means of machinery to work coal even or eight miles underground, so long as access to it was not shut off. But if during the next few years a barrier of a mile or a couple of miles of crushed waste or coal is interposed between the land and the remaining miles belt of sea coal, the latter in all likelihood will be lost for ever. In any case, however, a considerable breadth of coal where it approached the outcrop would necessarily have to be left as a barrier, and it is unquestionable that faults traversing the strata under the sea at a considerable depth and pressure of water, and especially if there are beds of porous sandstone overlying the coal seams, would give facilities for the influx of sea water into the mines so as to prevent or impede the working of the coal. Ventilating shafts to be sunk in the sea have been suggested as practicable by Sir George Elliott—a work we need scarcely add that would be of the greatest interest to the mining world.

WATER FAMINE AT THE EAST.—A dispatch, dated New York, Oct. 27th, says that the moderate rains of the past day or two have brought only partial relief to industries dependant on water power. The drying up of streams in the Atlantic States may be said to extend from the Androscoggin down to the James, and even some of the local rivers, like the Delaware, are fordable at points where such a thing has not been known for many years. The drought, however, is felt more seriously at the eastward, and its effects are beginning to be felt in commercial as well as manufacturing circles. The Boston *Journal* of yesterday says: The scarcity of water is having a had effect upon nearly all kinds of merchandise, restricting the demand, especially for the raw material. Cotton, woolen and paper mills are all running on short time. In Pennsylvania, New Jersey and Delaware, not a few important industries have been brought to a dead halt by the stoppage of the mills. The Passaic and Raritan are unprecedentedly low. The Brandywine is quite dry, and at Wilmington and other places in that part of the country, several establishments have been compelled to shut down.

An old writer in the time of Queen Elizabeth says in regard to mines and speculators: "A mineral man should be a hzard adventnrar, not esteeming much whathar he hit or miss. If he happen to win he must esteem it as nothing; if he losses all yet he must think he has got something." (No doubt the old gentleman meant "experience.") "If he find a rich vein let him not esteem it, for it is like a man etung with a nettle." (Itching for more, of course.) Another writer of the same era says: "When mines hit it is the best got gear in the world, it is so profitabla to all and hurts none; and when they hit not, although it be lost for a time, God is hereby honored in searching his hidden treasures out of the depths of the earth."

BARCELONA BULLION.—Twenty-three tons of Barcelona ore were worked in Eureka and Austin produced bullion valued at \$8,504, the average assay per ton being \$363 in silver and \$20 in gold. The Barcelona mine will undoubtedly develop into one of the finest properties in the State and its shareholders can expect dividends as soon as reduction works are put up. There are immensa amounts of high-grade ore in sight which guarantees bullion shipments for years to come. There are several other mines adjoining the Barcelona that will certainly be worked before long as they all have excellent prospects.

THE total population of the world is 1,459,920,500; of this number 838,704,000 are in Asia.

Working Test by Lixiviation.

We make the following extract on the above interesting subject, from a forthcoming work on lixiviation of gold and silver ores by C. H. Aaron. The generator and wash bottle are made of two wide-necked bottles, jars, or flasks, with corks, and some glass tubes. The corks should be soaked in melted paraffine, and the S tube is enlarged at the upper end, so as to form a small funnel, into which to pour the acid. If preferred, a glass generator and two-necked wash bottle can be bought of J. Caire, or J. Tynlor in San Francisco.

A chlorinating vat is made of a common wooden pail, or small tub, in the bottom of which, near the side, a hole is bored and a cork inserted. Through the cork is passed a piece of $\frac{1}{2}$ -inch glass tube 4 inches long. The cork and tube must not project above the bottom of the pail inside. A wooden cover is made to fit into the pail $\frac{1}{2}$ inch below the rim, and in it is a hole, fitted with a cork and tube similar to those in the bottom. The pail, while dry, is thoroughly coated inside with melted paraffine, which is caned to soak into the wood a little by the aid of heat. A filter is made in the vat by means of a layer of pebbles, covered with a piece of moistened grain sack, or similar material.

A weighed quantity, from 10 to 20 lbs. of the pulverized ore, or concentrations, is dand roasted or chloridized, in a small reverberatory furnace with the precautions indicated under "Special Directions." When cooled, it is slightly moistened and thrown on the filter in the vat. A space of not less than $\frac{1}{2}$ inch must be left between the surface of the ore and the cover, which is now placed, and luted with dough, or with a paste made from a mixture of equal parts of flour and paris plaster, which will not crack in drying.

Chlorine is generated from manganese and hydrochloric acid, the latter being more convenient for small operations than the sulphuric acid and salt used on the large scale. Three ounces of manganese are put into the generator, moistened with water and warmed on a sand bath resting on a small coal-oil stove. The acid is gradually added by means of the S tube. The exit tube of the generator is connected with the wash bottle, and that with the glass tube in the bottom of the vat by rubber tubing.

When a glass rod, dipped in ammonia and held to the tube in the cover of the vat, causes the formation of dense fumes, indicating the escape of chlorine, the surplus gas is conveyed out of the room by a rubber tube connected with the tube in the cover.

The chlorine is allowed to pass through the ore for an hour, more acid being poured into the generator, when required, to maintain the evolution of gas. The waste pipe is then closed by a pinchcock. The wash bottle is disconnected from the generator, but not from the vat, unless it is required for another operation, in which case the glass tube in the bottom of the vat is effectually, and conveniently closed, by immersing its lower end in melted stearin, paraffine or tallow contained in a small cup (dry cup), which is then allowed to congeal.

After the lapse of from 20 to 40 hours, as may be required, the cover is removed. A rubber tube, connected with the glass tubes in the bottom of the vat, is arranged to deliver into a glass, or porcelain vessel capable of containing about a gallon, and is closed by a pinchcock.

Water is now sprinkled on the ore, and when the latter has settled, more water is poured in until it is covered. After half an hour the pinchcock on the discharge pipe is adjusted, so as to allow the lixivium to flow in a slow stream, water being poured upon the ore from time to time to keep it covered. The leaching is continued until a sample of the lixivium, received in a test tube, no longer gives the slightest precipitate on addition of solution of iron sulphate. A more delicate test is that with tin protochloride, which, with the slightest trace of gold in the lixivium, gives a purple coloration.

The gold is precipitated by adding to the lixivium a strong solution of iron protosulphate, which is thoroughly mixed by stirring with a glass rod. To ascertain if enough of the iron sulphate to precipitate the whole of the gold has been used, a drop of the liquid is transferred, by means of the glass rod, to a porcelain dish, or a saucer, and is brought into contact with a drop of solution of potassium ferrid cyanide, or "red prussiate of potash." If an intense blue coloration if not produced, more iron sulphate is required.

The gold requires 12 hours to settle, after which the greater part of the clear liquid may be removed by means of one of the rubber tubes, applied as a siphon. The remainder, with the gold is thrown on a paper filter, or the whole of the liquid may be passed through the filter, to insure the collection of every particle of the metal.

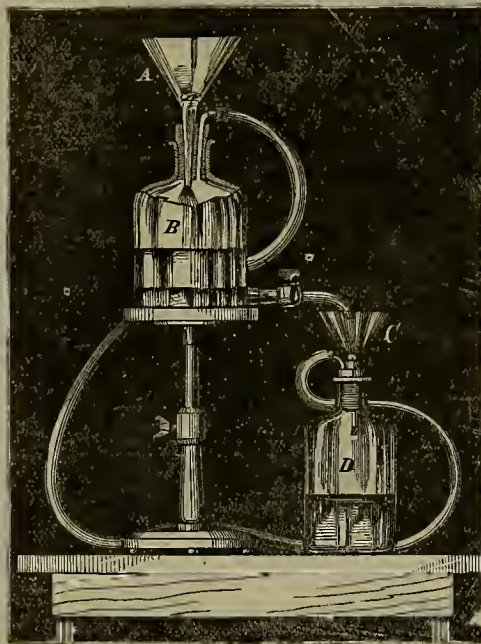
The side, and bottom of the vessel in which the precipitation was effected, and the glass rod with which the stirring was performed, are carefully wiped with pieces of filter paper, held in the forceps, to remove adhering gold, and the paper is added to the gold on the filter. The filter, with the metal is dried in the funnel, and is then placed in an assay crucible, together with an ounce or more of litharge, and a little borax, and smelted. The filter reduces a sufficient quantity of litharge to metallic lead, for the collection of the gold, which is then separated

ated by cupellation, weighed, and the result compared with the assay of the ore.

If the ore contains silver, the gold on the filter may be washed, first with water, and then with ammonia, before being dried, to remove any silver chloride which may be mingled with it, or the bend may be inactivated, and parted in the usual way. After the extraction of the gold, the ore, which in this case should have been roasted with salt, is leached with hypo for silver, as long as a precipitate is produced, by the addition of a drop of calcium-hypsulphite, to a sample of the lixivium received in a test tube.

The silver is then precipitated with calcium sulphide, as in the large way, except that as it is not necessary to preserve the hypo, an excess of the sulphide is used, so that not a trace of the metal may be lost. The precipitate is coagulated by heating on a sandbath, separated from the liquid by filtration, dried and dressed on the filter with litharge and horax, then fused in a crucible with the addition of a little niter, to prevent the production of too much lead by the action of the sulphur on litharge. The lead button obtained is cupelled, and the resulting silver bead, after weighing, should be subjected to parting, as it may contain a little gold. The tailings are dried and weighed. The loss of weight found to have been sustained by the ore in the working, is reduced to percentage. An assay of the tailings is then made, and from the result the same percentage is deducted. The remainder is the loss per ton of ore, by insolubility. This is added to the amount per ton extracted, and the sum deducted from the assay value of the original ore. The remainder is the loss per ton by volatilization, dusting and other causes.

ROAD LOCOMOTIVE.—While taking a consti-



APPARATUS FOR CLEANING QUICKSILVER.

tutional (walk, not dram) yesterday morning, our attention was attracted by a singular looking engine placed in position on the Ophir claim, and prepared to do good service in hoisting ore and water from the incline. Drawing nearer and subjecting the nondescript to a close examination, we were not a little surprised in discovering a very compactly built road locomotive, a machine constructed for the purpose of hauling ore to the mill, but which it is the intention of the owner to employ as a hoisting engine during the fall and winter. It consists of a locomotive engine placed in the middle of a very strong framework of timber, the whole being supported by two large driving-wheels, about five ft. in diameter each, placed one on each side in front, and a smaller guide wheel centrally located behind. This, the first road locomotive constructed in Montana, was built by Mr. J. F. Allen, formerly proprietor of the Butte foundry. He estimates its hauling capacity at 20 tons on a level road. The Ophir, owned by John Noyes & Co., is worked under lease by Mr. Allen. It is a well-defined vein, dipping south, and quite wet at the depth of 20 ft. Rich hauls are taken from the incline ranging from 30 to 300 oz. silver per ton, and to judge from the slight depth yet reached, the ore promises to improve as the incline goes down.—*Butte (Montana) Times.*

A VERY slight declivity suffices to give the running motion to water. Three inches per mile in a smooth, straight channel gives a velocity of about three miles an hour. The Ganges, which gathers the waters of the Himalaya mountains, the loftiest in the world, is, at 180 miles from its mouth, only 800 ft. above the level of the sea; and to fall these 800 ft. in the long course of the water, requires more than a month.

THE Belmont mill will soon be put in order and started on the ore now on the dump, aggregating nearly 3,000 tons, including about 400 tons of first-class rock.

Cleaning Quicksilver.

Of course the best way to clean quicksilver is to retort it, but it is not always convenient to do that unless all the appliances are at hand. The bulk of foreign matter may be removed by other means, however.

A convenient device is a long glass tube into which mercury is poured through a paper funnel, the funnel having a pin hole at the bottom and serving to retain the dirt and dust. The tube may be filled with dilute nitric acid, and be provided with a stop-cock below; or with a bent tube so that a short column of mercury may balance a long column of acid.

An ordinary filter in a funnel, with a hole in the bottom of the filter, will remove a good deal of impure foreign matter from mercury.

Another method is to place the mercury in a basin and force nothing but cold or warm water through it from below, and any grease or foreign matter is carried off. If one has not steam power, etc., water may be led in pipes with the proper fall. The basin has a cock and valve to draw off the clean mercury. Care must be exercised not to force the water too violent so as to cut up the quicksilver too much, and so carry off finely divided particles.

A little dilute nitric acid should be kept on the surface of the mercury in its receptacle.

Another very good means of purifying quicksilver was recommended some years ago by Prof. Leids, of the Stevens' Institute of Technology. We have previously described the apparatus, which is shown in the accompanying engraving. It consists of a glass funnel, A, capa-

ble of holding five or ten lbs. of mercury, the tube of which is cut off at a point just below the stopper of the bottle, B. Cotton wool is jammed into the tube until it fills up the neck, and bulges out the bottom of the funnel. A short glass tube bent at right angles passes likewise through the india rubber stopper of the bottle, and is connected with a water air-pump. The bottle is two-thirds filled with dilute nitric acid (one part of acid and four or five parts of water). The impure mercury is poured into the funnel, A, is drawn through the cotton plug in a multitude of streams, and passes as a fine rain through the acid below. The foreign metals, if not in too large quantities, are removed by solution in the acid, and the pure mercury collects below. It is then run off through the stop cock into a second funnel, C, and after being thoroughly dried by suction through another plug of cotton wool, it is caught and preserved in the bottle, D. A short time suffices for the almost automatic purification of a large quantity of mercury.

THE Eberhardt and Aurora tunnel, at White Pine, was finished a few days ago. It is 6,200 ft. long. It has taken about four years to complete this big job, and it is spoken of as a first-class piece of work. They will commence to crosscut as soon as the upraise connects the tunnel with the incline, and a good circulation of air is ensured.

ONE day last week, says the Oroville Mercury, the head dam of the Forbestown ditch caught fire and was destroyed. The dam is situated on Lost creek, Plumas county, 75 ft. in height and backs the water up for nearly three miles. It was two years in building and cost \$60,000. It caught from fire raging in the woods.

TAYLOR'S foundry at Grass Valley was partially burned Tuesday night of last week. The fire, which originated in the pattern room, was doubtless started by an incendiary, who first cut to pieces the hose on the premises.

On the Primary Structure of Insects.

(Read at the meeting of the Arthrozoic Club, San Francisco, on Wednesday, Oct. 27th, by Dr. H. Baus.)

The only animals that possess real organs for flight are insects. The bird's wings are but modifications of the anterior pair of feet.

This circumstance shows clearly that the wings of the insect cannot be modified feet; it is a proof that their origin is entirely different from that of the bird's wing, because the same organ cannot exist at the same time in its original form and in a modification.

To trace up the origin of the insect's wing, we have to retrace our steps to the lower type of arthrozoa and its repetition in the larva and chrysalis state of the typical insect.

We all know that the body of the arthrozoic animal, be it worm, myriopode, arachnid or insect, is a compound of segments, linked together pretty much like the vertebral column of higher animals, only that the arthrozoic column, forming an external skeleton, includes and protects all the viscera, which, in the vertebrate animals, are included in a second cavity. In this case it is especially the respiratory apparatus that interests us. There is no common entrance into this apparatus like the tracheae of higher animals. Each joint of the many jointed animal has on each side its private entrance, called spiracles, which leads into a system of tubes called tracheae, and ladder-like extensions called air sacs.

These tubes and bladder-like expansions connect amongst each other, in different ways, and form a system of air-conducting vessels, diminishing in size in proportion as they branch off, and embracing with their last dendritic ramifications, the last ramifications of the vascular system.

There is a certain analogy in this arrangement with the respiratory organs of vertebrates, but a vast deal of difference arises from the circumstance that in the vertebrate animal the respiratory organ occupies only a part of the animal, when in the insect it pervades the whole animal.

The more we advance from the homogeneous form of the worm and the myriopode to the differentiated form of the crustaceae, drachnide and insects, the more we observe a tendency of the single organs to come to definite members and lawfully fixed position.

The typical crustacean and drachnide consolidate the anterior segments into the form of the cephalothorax, developing in the higher crustacean the number 10; in the drachnide the number 8.

In the insect the cephalothorax of the previous group separates into head and thorax; the latter in the coleoptera even separating the prothorax from the middle and posterior segment in the shape of what is called neck (collum).

The number of feet in the perfect insect is always six, a pair for each segment of the three joints of the thorax. In the typical insect two pairs of wings are added, always inserted in the middle and posterior segment of the thorax.

It is not a mere coincidence that these two consolidated segments never possess spiracles, so far as I know.

The wings are a modification of the respiratory organs of the insects, no more serving for respiration, but for locomotion. The point of insertion is the spiracle; the nervulation of the wing is the system of air tubes, or tracheae; the double membrane expanded between them is an air bladder flattened out into a plane.

Agassiz, in a most interesting treatise, has directed the attention of entomologists to the fact, that the transformation of the metabolite insect, repeat, in their worm-like larva, the myriopode; they imitate by the cephalothorax of the chrysalis, the crustacean and the drachnide.

Now the larva possesses the two spiracles on each segment. In the chrysalis the cephalothorax has no spiracles; but in the winged classes, even in this imperfect state, abdominal air bladders begin to form, perhaps to vicariate by their expansion for the tracheae and spiracles of the meso and metathorax, where activity is no more a respiratory one. I have not yet found an exception to this arrangement, but it is possible that the law does not exist in the same purity in the ametabolous groups.

THE Original Empire mine, of Grass Valley, one of the earliest quartz mines opened in this State, has again resumed production. It was closed down some time ago on account of water and other difficulties, but after passing into new hands the water was pumped out and the quartz found to be as plentiful and productive as ever.

THE Vandewater mining company, in Spring Valley, shipped to New York recently 500 lbs. of Stedefeldite ore, which assays from \$2,000 to \$6,000 per ton. This ore runs in streaks from two to four inches wide in the Eagle mine, owned by the Vandewater company.—*Silver State.*

THE Manhattan mill, in Austin, last week reduced 135 tons of ore, and produced \$42,865.87 in bullion.

THE shipments of bullion from Silver Reef for the month of October aggregated \$102,621.32.

TOTAL bullion shipment from the Stormont mine for October, \$52,698.

The University Mine.

Mr. D. F. Moore, Superintendent of the University mine (Bodie), has presented the following annual report:

To the President and Directors of the University Gold Mining Company—GENTLEMEN: The following is my report of the work done and the developments made in the University mine for the year ending Oct. 27, 1880, together with its present condition and prospects: At date of last annual report (Oct. 27, 1879) our new three-compartment shaft had been sunk to a depth of 164 ft. from surface. Sinking was continued uninterruptedly till a depth of 510 ft. was attained; here a station was opened, and cross-cuts northeast and west were run with the following results: To west crosscut, 92 ft. from shaft, we cut into a ledge formation five ft. in width, which, though carrying some fine ore, was badly broken up and did not deem it advisable to prospect it, as from its dip it would be carried into the shaft at a greater depth. This crosscut has been run a distance of 112 ft.; in northeast crosscut at 100 ft. from shaft, a solid ledge two and a half ft. in width was cut, but, as to reach our main ledge was our principal aim, we did not drift on it. Wishing to attain a depth of 700 ft. as speedily as possible, and still have stations opened at convenient places, I suspended work on this level and resumed sinking. When a depth of 610 ft. was reached, a strong flow of water compelled us to stop, and here another station was opened and a crosscut started west; at 14 ft. from shaft another new ledge 18 inches wide was passed through. We run this crosscut a total distance of 55 ft., water then disappearing from shaft we again resumed sinking, until a depth of 665 ft. was reached. Here our third station was opened, and then continued the shaft to a further depth of 25 ft., when water again interposed with our operations. Work was then for a time confined to 665 level, an east crosscut was run 124 ft., also a west crosscut 56 ft. from shaft, neither of which was run far enough to intersect any of our ledges. In order to reach our main ledge as speedily as possible, resumed work in northeast crosscut 510 level, that being the farthest advanced in that direction, and in which we are now in a distance of 223 ft., and are in daily expectation of cutting the ledge. The formation in lower level indicates that our ledges when cut at that depth will be principally silver bearing. To summarize our work for the year, we have sunk and timbered our shaft 526 ft. (making a total depth of 690 ft. from surface), have opened three stations, run 570 ft. of drifts, discovered and recorded two new ledges. Our property now consists of a mining claim 1,500 ft. in length by 400 ft. in width (and though as yet but little prospected), shows five well defined ledges, and adjoining one of the most valuable mines in the district—No. 24. Hoisting works, which for strength and durability are unsurpassed by any here erected; machinery of the newest and most approved pattern, working to our entire satisfaction, and now having done all our dead work, we are fully and amply prepared to open up and develop our mine. With all these facilities coupled with present indications, I am firmly of the opinion that in a short time the University will prove one of the most valuable mines of this district. All of which is most respectfully submitted.

RED MOUNTAIN.—A correspondent of the Monitor Argus, Alpine county, says: The last find is in Red mountain, on the west side of Hope valley, at an altitude of over 1,000 ft. above the valley. The mountain runs north and south, and the ledges run a little east and west of that line. They are large and well defined. Three ledges, called respectively New York, Boston and California Comstock. The find is called the "Wonder," and is located on the California Comstock, north of Crater lake where a break has occurred, crossing two of those ledges. The lake is of great depth, never having been fathomed. It is nearly round and about 40 rods in diameter. A small stream of water coursing down the Wonder has cut a part of it down 40 or 50 ft., leaving nearly perpendicular sides. At this season of the year the snow is nearly all melted, so there is but little water running, and you can get into the bottom of the cut, where, if you will take your hand and throw water upon the wall of rock on the other side of you, I think you will exclaim, "What a wonder!" for wherever the wall is washed by the water, the sparkling mineral is plainly to be seen. There are thousands of tons of rock here exposed that will pay handsomely to work for gold and silver. I broke a piece of rock weighing several pounds from the ledge over three weeks ago, that will assay over \$1,000 to the ton, free gold, saying nothing of what is contained in the sulphurets. In an adjacent ledge the ore contains gold, silver, copper and nickel—silver from \$20 to \$50 per ton, and copper from 20% to 75%. In fact we get some native copper, and different combinations of copper, viz., the double sulphide, red, black and gray oxide; blue and gray carbonate and gray malachite.

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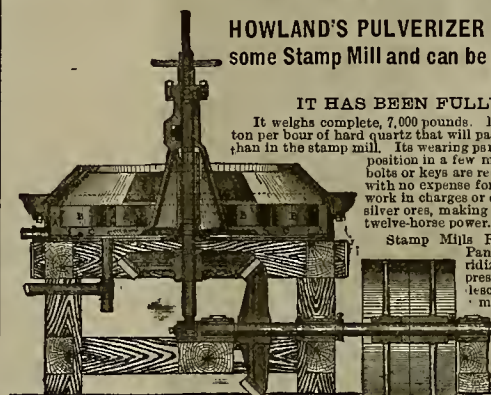
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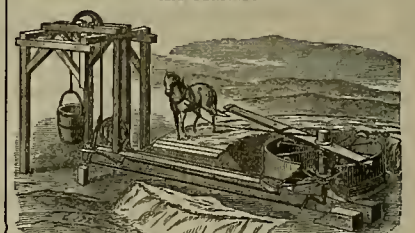
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List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING NOVEMBER 20, 1880.

233,905.—STEAM GENERATOR—D. Abell, Carson, Nev.
233,923.—WINDMILL—D. C. Harris, Borden, Cal.
234,036.—STOCK CAR—C. G. James, Petaluma, Cal.
234,058.—KNOB-ROSE—J. F. Peacock, S. F.
234,076.—BED-PAN—W. M. Searby, S. F.

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DECISIONS OF THE U. S. COURTS.

Campbell vs. James, et al.

U. S. Circuit Court, Southern District of New York.

Decided April term, A. D., 1879. Wheeler, J.

1. The re-issued Letters Patent, No. 4,143 (Division A), granted to Helen M. Ingalls, October 4, 1870, for an improvement in post-marking and canceling stamps, the original patent having been granted to Marcus F. Norton, April 14, 1869, and re-issued to Jacob Shavorani A. C. Corse, August 23, 1864, and re-issued to M. P. Norton August 3, 1869, declared valid.

2. The judgment of the Commissioners of Patents discharging a solicitor for surreptitiously placing a copy of a caveat in the official files extends only to the exclusion of the solicitor, and not to the effect of the paper as evidence *in pais*, although its effect upon the instrument as a caveat of record might be greater.

3. Where a document is introduced in evidence by a defendant to prove admissions by the inventor inconsistent with his claim, such document is legitimate evidence according to what should appear its just weight, as well as to those facts in favor of the inventor as to such as are against him.

4. Although the weight of evidence might be in the defendant's favor if the question as to prior use of the invention were to be determined upon a fair balance of proof and upon the oral evidence alone, still, in order to defeat the patent by showing an invention prior to a clearly established one of the patentee, it must be as clearly established to the extent, at least, of removing all fair and reasonable doubts.

5. By provisions of the Act of 1836, section 15, it was only public use or sale with the consent and allowance of a patentee before the application for a patent that would defeat the patent. The Act of 1839, section 7, did not change the character of the public use or sale that would defeat a patent, but provided that no patent should be held invalid by reason of them unless "such purchase, sale, or prior use has been for more than two years prior to such application for patent."

6. The defense of public use, for more than two years prior to the filing of the application upon which the patent was granted must be clearly proven. A private use for testing the invention, and informing the inventor as to its perfection and usefulness, with the design on his part all the while to procure a patent, will not sustain such defense.

7. If the re-issues of an original patent are for any other or substantially different invention from that described in such original patent, they are unquestionably void; but the fact that the specifications or claims are, in substance, the invention or discovery remaining the same, is of no consequence.

8. If a form of a device, embraced in a re-issued patent had not been mentioned in the original patent, it might well be said not to have formed any part of the conception of the inventor; but if described in such original patent, although referred to as not being so useful or desirable in the combination as another form of such device, it might, nevertheless, be properly embraced by the re-issued patent.

9. It is doubtless true that a re-issue to a person not the owner would not affect the title of the owner. The re-issue and title should go together to make a good title to the re-issue, or at least the re-issue should be consented to by the true owner.

10. The defense that the plaintiff's title fails because one of the parties through whom such title is derived did not own the patent when it was surrendered by and re-issued to him, was sought to be sustained by showing that a certain instrument of writing was forged by such party by placing it before and attaching it to the genuine execution of another and different instrument. It appearing that the parties whose assignment such instrument purported to be, had knowingly acted upon the same; *Held*, that this ratified and confirmed the instrument as good from the beginning.

11. A conveyance executed by the signature of a company with seal, and by S., president, and another seal, is a good execution, both for the company and for S. individually.

12. It appearing that the conveyance was one expressly in trust, upon condition that the plaintiff should have the sole management of the trust until a fair, just and reasonable settlement should be had with the United States for the use of the invention in the postal service of the United States by the post-office department; *Held*, that as no such settlement had been made, the limitation in the conveyance had not expired, and the right to bring suit for infringement was in plaintiff.

13. The grant of letters patent for an invention is exclusive throughout the United States, and reserves no right to the government to use the same.

A decree entered that the patent is valid, that the de-

fendant has infringed it, and for an account of profits and damages, with costs.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

News in Brief.

TORNADO in Utica, N. Y., on Saturday. HEAVY gales have caused disasters on the great lakes.

THE fast Australian mail was detained 12 hours at Queenstown.

NEARLY 1,000 houses have been erected in Denver during the year.

PRINCE GORTSCHAKOFF is very ill, and it is not likely he will recover.

THE Socialists ejected from Hamburg will come to the United States.

A POWDER magazine in Lacrosse, Wis., was exploded Monday by shots fired into it.

THERE is a great scarcity of bread in Russia, in spite of American importations of wheat.

FROM 200 to 300 miners at Akron, Ohio, have struck, demanding an advance of 10 cents per ton.

THE Porte is making tremendous efforts to be in position to effectually close the Dardanelles at short notice.

THE expelled French monks are receiving a cordial welcome in Spain, where all classes vie in tendering them hospitality.

considered all further pleadings needless in a country where the motto of a government is: "Might is right."

MEXICAN papers demand that the United States shall help pay the reward of \$2,000 for Victorio and \$22 for each Apache killed, as well as aid in relieving the want caused by the raid.

It will cost the cotton planters about \$40,000,000 to market their crop this year, of which \$25,000,000 will go into the pockets of colored laborers, many of whom are women and children.

It is reported that Queen Victoria has asked Gladstone to propose to Parliament a grant of £40,000 to enable the Prince of Wales to pay his most pressing debts, and that the Premier has declined.

A RUMOR was widely published in the New York dailies that Chinese labor is being introduced in silk and other mills of Patterson, N. J., and is met with an indignant denial by the manufacturers.

THE New York *Telegram* has the following Washington special: The reported loss of Bennett's Arctic exploring steamer *Jeannette*, with all on board, telegraphed from San Francisco, is doubted here.

EDDIE J. Cahill, aged eight years, was accidentally shot and killed by his 11-year-old brother, at San Leandro, Sunday. The latter took up the gun to snap a cap at his brother

The Clayton Air Compressor.

(CONTINUED FROM PAGE 305.)

of the piston at a given rate of speed is treated in the same manner as the steam pressure is treated in the ordinary steam engine card in propelling the piston forward at a given velocity.

The merits of any diagram taken from an air-cylinder should be judged according as the compression-line following the hyperbolic curve, which represents an increase of pressure at a constant temperature. An approximation to the curve can be obtained only by the absorption of the heat as rapidly as it is rendered sensible by the compression.

For convenience, the hyperbolic curve is shown on all the diagrams accompanying this article, which were taken from a duplex and double-acting Clayton air compressor (same as illustrated) having steam and air-cylinders of equal diameter and stroke, while delivering the air into a receiver, the safety-valve of which was set at 45 lbs. pressure. Consequently the resistance was uniform during the trial. The speed also was the same (53 revolutions per minute), excepting when No. 1 was taken.

The speed in this case was increased from 53 to 65 revolutions per minute, in order to determine the limit to which the speed of the air-piston could be increased and still the cylinder

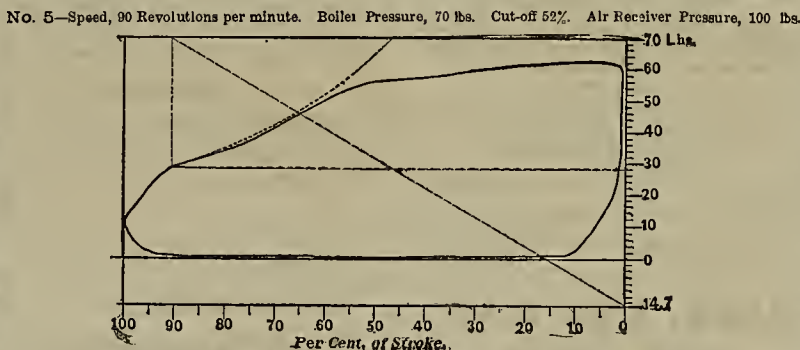
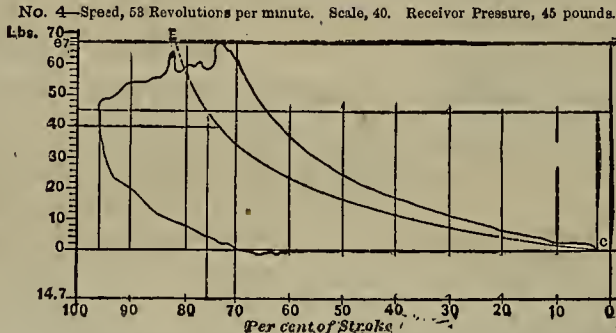
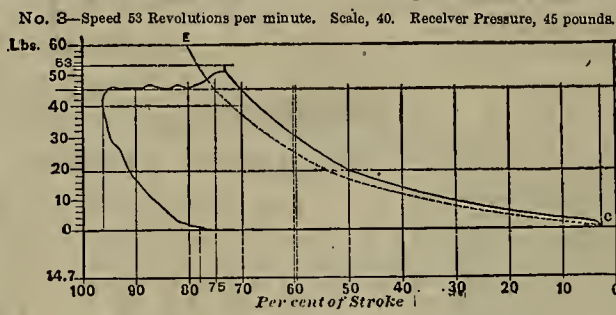
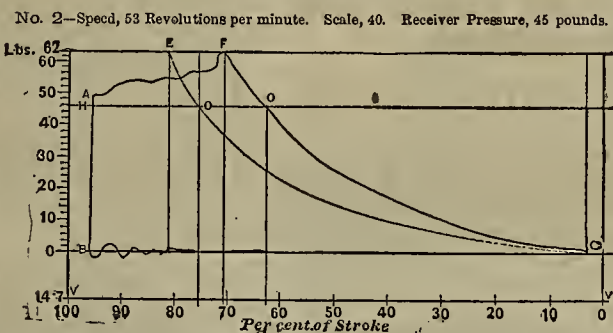
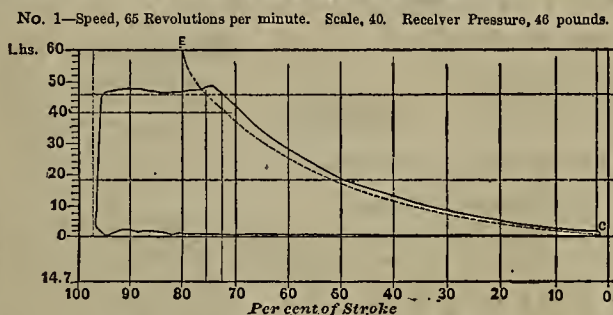
be filled with air of normal density before reaching the end of the stroke, when compression commences, without changing the proportion of "inlet valve" opening to area of piston, which is adopted in constructing these compressors.

Card No. 1 was taken from the air-cylinder when supplied with water for lubricating the interior surfaces and also filling the "clearance" spaces. Water was supplied the exterior jacket, and the "tripping device" adjusted to act at the proper time in opening the delivery valves. The diagram shows that at the speed the compressor was moving, the action of those parts which could directly influence the action of the indicator was almost perfect. From the point at which "induction" ceased and compression commenced, the pencil followed the "hyperbolic," or curve of constant temperature.

Card No. 2 shows that without the "tripping device," the pressure is raised before it lifts the discharge valve from 46 to 62 lbs., the water running in the cylinder, as in card No. 1, but not in the water jacket, and shows how the air is heated and expanded in advance of its full pressure.

Card No. 3 shows the suction valves lifted automatically, but a heavy loss is occasioned by absence of water from the cylinder, as the compressed air not discharged at the end of the stroke followed the piston back about one-fifth of its stroke. Card No. 4 is taken from the cylinder without water in the jacket or in the cylinder, and with the discharge valves lifted without the assistance of the toes. This shows a heavy loss of power through the air becoming heated, consequent on entering into a hot cylinder, a great loss in compressed air expanding back in the cylinder and occupying the space which should be filled by fresh air, and an immense waste of power in the power required to lift the valves; viz., from 45 lbs., the working or receiver pressure—to 67 lbs., the pressure at which the valves lifted. This card is probably a fair average of the result which would be obtained by "indicating" the air cylinders of some of the imperfect compressors at present in use. It is self evident that a compressor producing such a card would in a very short period consume an amount of fuel—in proportion to the percentage of effective working power in the shape of compressed air given—the cost of which would equal the price of a new compressor of improved construction.

Card No. 5 was taken from the "steam cylinder" of one of these compressors, and shows the degree of economy attained to in its consumption of steam. The compressor was running at 90 revolutions per minute, with a boiler pressure of 70 lbs., cutting off steam at 52% of the stroke, and giving an air receiver pressure of 100 lbs. Taken as a whole, the Clayton air compressor seems to be as nearly automatic in its action as it well can be, showing that its details have been carefully studied by the designer, and the large sales reported attest the general excellence of materials and workmanship. Farther information can be had of the Clayton Steam Pump Works, 14 and 16 Water St., Brooklyn, N. Y.



INDICATOR CARDS FROM CLAYTON AIR COMPRESSOR.

GEN. BENET, Chief of Ordnance, in his annual report calls attention to the necessity for a new machine shop at the Benicia arsenal.

It is stated that Gen. Grant prefers the Secretaryship of War to the Illinois Senatorship, and will probably be offered that position.

GREECE is getting ready. The Minister of Finance has asked for an extraordinary credit of 36,000,000 drachmas for the War Ministry.

CHINAMEN, to the number of 562 left this city by the last steamer for China. Lack of employment is the reason given for their departure.

THE Shah of Persia has appealed to Russia for help against the Kurds. The government has consented to give help under certain limitations.

ENGLAND, at the instance of Persia, has requested the Porte to station a guard on the frontier, in order to prevent incursions of Kurds into Persia.

UNDER the California law no more deer can be killed from November 1st until next July. Trout cannot be caught between October 15th and April 1st.

CAPTAIN EADS will soon sail from New Orleans to Mexico with a party of engineers to examine the Isthmus of Tehuantepec in order to verify his idea that it is suitable for a ship railway.

BEFORE the Tribunal of Conflicts, in Paris on the 5th, Boviel, of counsel for the Jesuits, declared that in view of the expulsion of 11 religious congregations in Paris on that day, he

thinking the gun was empty. It was, however, loaded.

THE Board of Trade returns for October show a decrease of £4,881,000 in value of imports into the United Kingdom, and an increase of £978,000 in value of exports, compared with the same month last year.

THE French Cabinet discussed on Saturday the declaration to be made at the opening of the chambers. The programme is expected to be a reorganized Ministry, reform of the laws relative to the press, and the right interpretation of the education laws.

DR. TANNER is making arrangements to fast 40 days in London. He says the advocates of alcohol may select six men as near his age and physical condition as possible, who can take wine, beer or any spirituous liquor, during the fast, and he will take water only.

THE stage from Georgetown to Auhurn, Placer county, on Monday, was stopped about a mile and a quarter from Auhurn station by a masked man armed with a Winchester rifle. He took Wells, Fargo & Co.'s box, containing \$2,159.30 in coin and \$285 in gold dust.

THERE was a terrific wind storm at Montreal on Sunday. A three-story house on St. Mary's street, occupied by a wholesale and retail grocer, was blown down. Damage to stock heavy. The clipper ship *Ravenrag* was blown on her beam ends at the wharf, but was afterward righted.

Quinine and Aconite

Form the basis of many of the Acute Remedies in the market, and are the last resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. AYER'S ACUTE CURE is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent, certain, and no injury can result from its use. Besides being a positive cure for Fever and ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive as well as cure, of all complaints peculiar to malarious, marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

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Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving additions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

BOOKS VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Chas Jackson's Best Sweet Navy Tobacco

Gold, Legal Tenders, Exchange, Etc.
[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, Nov. 10 3 P. M.

SILVER. 1 GOLD BARS, 890@910. SILVER BARS, 10@13 cent. is count.
EXCHANGE on New York, 15@20, on London bankers, 49@49 1/2. Commercial, 50; Paris, five francs \$1 dollar; Mexican dollar, 20@23 1/2.
LONDON Consols, 99 13-18; Bonds (4 1/2), 113 1/2.
QUICKSILVER in S. F., by the flask, 42 1/2@45. lb.

LUMBER.

WEDNESDAY M., Nov. 10, 1880.

FINE AND REDWOOD CARROT RATES.
PINE.—Rough, 16 00
Flooring & Step, No. 2, 24 00
Redwood.—Rough, 16 00
Flooring & Step, No. 2, 24 00
PICKETS, Fancy Pointed, 20 50
do, Rough Pointed, 16 00
do, do, Square, 14 00
Shingles, 20 00

LEATHER.

WHOLESALE.

WEDNESDAY, M., Nov. 10, 1880.

Sole Leather, heavy, lb. 30 @ 32
Light, 25 @ 28
Jodot, 8 to 10 Kil, doz. 36 @ 46 00
11 to 13 Kil. 50 @ 55 00
14 to 16 Kil. 65 @ 72 00
Second Choice, 11 to 13 Kil. 40 @ 45 00
Simon Ulmo, Females, 12 to 13 Kil. 62 @ 65 00
14 to 15 Kil. 61 @ 65 00
16 to 17 Kil. 87 @ 90 00
Simon, 15 Kil. 81 @ 84 00
20 Kil. 65 @ 65 00
24 Kil. 70 @ 73 00
Kips, French, lb. 1 00 @ 1 37 1/2
Cal. doz. 43 @ 54 00
French Sheep, all colors, 12 00 @ 16 00
Eastern Oalf for Backs, lb. 1 00 @ 1 25
Sheep Roans for Topping, all colors, doz. 9 00 @ 10 00
For Linings, 6 50 @ 10 00
Cal. Russel Sheep Linings, 3 00 @ 6 50
Boot Legs, French Oalf, pair 4 00 @ 4 50
Good French Oalf, 4 75 @ 5 25
Best Jodot Oalf, 35 @ 40
Leather Harness, B. 45 @ 50
Fair Bridle, doz. 45 @ 55 00
Skiing, lb. 33 @ 37
Well, doz. 30 @ 36 00
Buff, ft. 17 @ 20
Wax Side, 19 @ 20

METALS.

(WHOLESALE.)

WEDNESDAY M., Nov. 10, 1880.

IRON.—American Pig, soft, ton. 32 00 @ 33 00
Scotch Pig, ton. 36 00 @ 37 00
American White Pig, ton. 36 00 @ 37 00
Oregon Pig, ton. 36 00 @ 37 00
Refrined Bar. 4 @ 8 84
Horse Shoes, keg. 7 @ 8 00
Nail Rod. 9 @ 9
Norway, according to thickness. 8 @ 9 1/2
STEEL.—English Cast, lb. 16 @ 18
Black Diamond, ordinary size. 13 @ 15
Drill. 13 @ 10
Flat Bar. 12 @ 18
Flaw Steel. 9 @ 10
COPIES.—Ingot. 52 @ 52
Sheet. 42 @ 42
Sheathing, Tinned 14x18. 42 @ 42
Nails. 42 @ 42
Bolts. 38 @ 42
Old. 42 @ 42
Bar. 22 @ 22
Precipitate, 100 fine. 18 @ 19
LEAD.—Pig. 41 @ 5
Bar. 6 @ 6
Pipe. 8 @ 8
Pipe, Roll. 8 @ 9
Shot, Discount 10% on 500 Bags. 2 @ 2 10
Drop, per bag. 2 @ 2 10
Buck. 2 @ 2 30
Oiled. 2 @ 2 50
TIN PLATES.—10x14 10 O Charcoal. 10 @ 10
10x14 10 O Coke. 10 @ 10
Banco Tin. 25 @ 25
Australian. 20 @ 20
10 O Charcoal, Rolling 14x18. 21 50 @ 22 00
ZINC.—By the Cask. 10 @ 10
Zinc, Sheet 7x3 ft. 7 to 10, lb. less than cask. 10 @ 11
NAILS.—Assorted sizes. 4 00 @ 4 75

Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending Nov. 9, 1880.

HIGHEST AND LOWEST BAROMETER.

Nov. 3	Nov. 4	Nov. 6	Nov. 8	Nov. 7	Nov. 8	Nov. 9
30.175	30.072	30.165	30.135	30.158	30.116	30.112
30.050	30.023	30.042	30.121	30.078	30.045	30.069
MAXIMUM AND MINIMUM THERMOMETER.						
67	75	75	72	70.5	72	64.5
53	58	50	63.5	54.5	54	63
MEAN DAILY HUMIDITY.						
78.7	35.7	30.7	55	75.7	61.7	71
PREVAILING WIND.						
SE	N	SE	NW	W	NW	W
WIND—MILES TRAVELLED.						
126	156	120	98	98	137	136
STATE OF WEATHER.						
Clear.	Clear.	Clear.	Clear.	Fair.	Fair.	Clear.
RAINFALL IN TWENTY-FOUR HOURS.						
Total rain during the season, from July 1, 1880, 00.06 in.						

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

San Francisco, November 3d, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 11) of Twenty-five (25) Cents per share was declared, payable on MONDAY, November Fifteenth (15), 1880, at the office of the Company, Room 19, No. 323 Montgomery Street, San Francisco, Cal. Transfer books will be closed from Thursday, November Eleventh (11), 1880, until Tuesday, November Sixteenth (16), 1880.

JOSEPH NASH, Sec'y.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,

SAN FRANCISCO, CAL., NOVEMBER 10, 1880.

At a meeting of the Board of Directors of the above named Company held this day, Dividend No. 37, of Fifty cents (50c.) per share, was declared, payable on Monday, November Fifteenth (15th), 1880. Transfer books closed on Thursday, November Eleventh (11th), 1880, at three o'clock, P. M.

WM. WILLIS, Sec'y.

Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

Office of the Standard Consolidated Mining Co. San Francisco, November 1, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 21, of Seventy-five (75) cents per share, was declared, payable on Friday, November Twelfth (12), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York. WM. WILLIS, Sec'y.
Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

Lewis Consolidated Silver Mining Company.—Location of principal place of business, San Francisco. Location of works, Pioneer Mining District, Placer County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2d) day of October, 1880, an assessment, No. Three (3), of Ten (10) Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 15, No. 310 Pine Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the First (1st) day of December, 1880, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the (20th) Twentieth day of December, 1880, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
J. W. PEW, Secretary.
Office—No. 310 Pine Street, Room 15, San Francisco, Cal.

Land Purchasers Association.—Location

of place of business, San Francisco, California. Notice is hereby given that at a meeting of the Directors, held on the Ninth (9) day of November, 1880, an assessment of Five Dollars (\$5.00) per share (being a part of the 4th installment on the subscription to the stock), was levied upon the capital stock of this Association, payable immediately to the Secretary, at 318 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid, on Friday, the Tenth (10) day of December, 1880, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
C. S. WRIGHT, Sec'y.
N. B.—This assessment is to pay the taxes on the property of the Association for the current year.

Amusements.

BALDWIN'S THEATER.

THOMAS MAGUIRE.....Manager.
CHAR. H. GOODWIN.....Treasurer.
J. P. CHAPMAN.....Assistant Treasurer.

A GOLDEN GAME.

Corner Market and Powell Streets. Open every evening and Saturday matinee. Box office open daily.

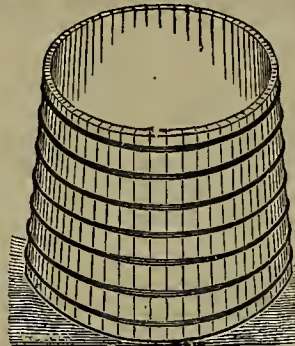
BUSH STREET THEATER.

CHAR. E. LOCKE.....Lessee and Manager

MILTON NOBLES.

Open every evening and Saturday Matinee.

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A Treatise on the Horse and his Diseases.

By B. J. KENDALL, M. D.



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M. B. DODGE, 143 Fremont Street, S. F.

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Every one interested in any Bodie Mine should have one of these first-class maps, which shows all the locations and gives sketches of the principal mines.

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WANTED!

SITUATION as ASSAYER

By a young man who thoroughly understands assaying all kinds of ores. A graduate of Kustel & Riette, to whom he refers. Address his father,

F. HOFLING, Jeweler,

No. 5 Third St., S. F.

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Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

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Foreign Patents.

In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than any other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

Situated so remote from the seat of government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

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We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars free.

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Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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We have superior artists in our own office, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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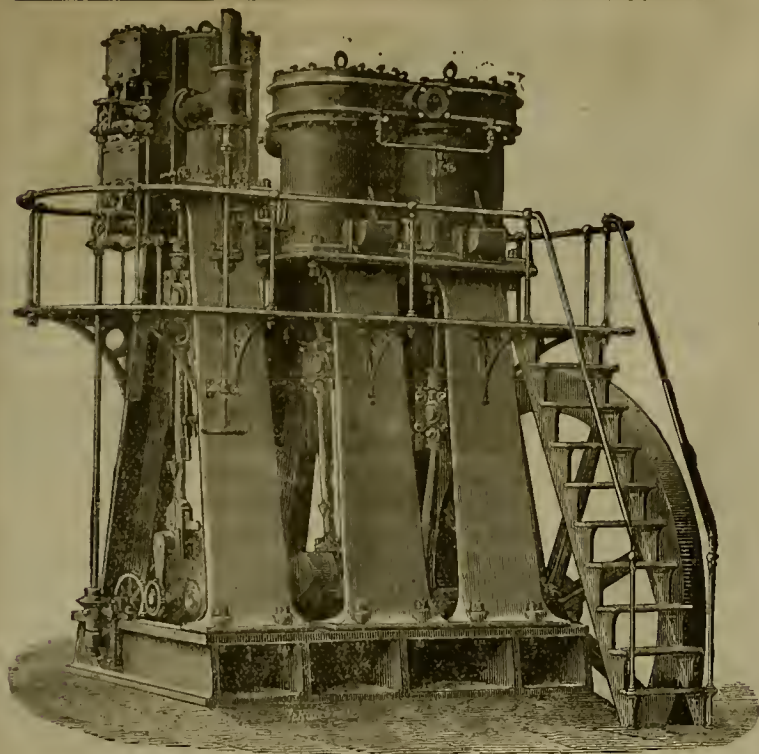
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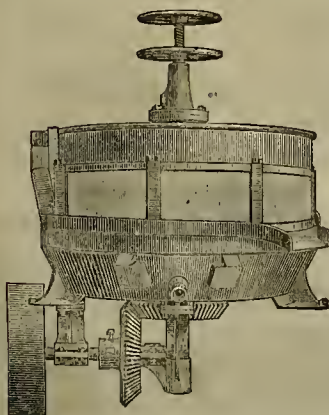
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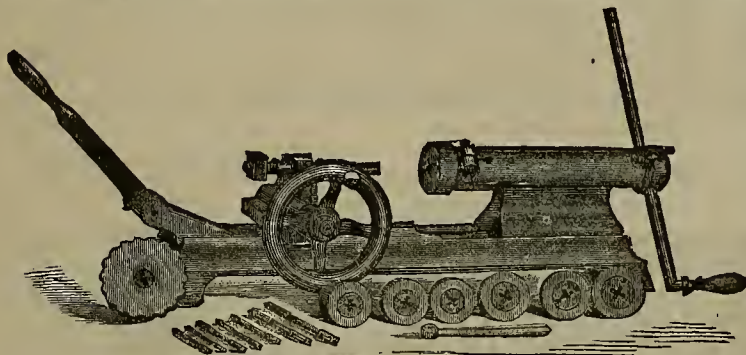
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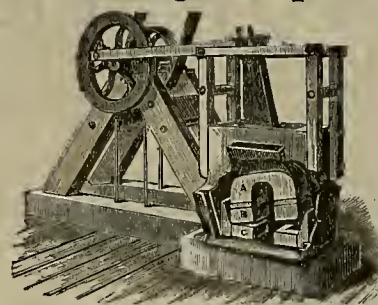
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SAN FRANCISCO, SATURDAY, NOVEMBER 20, 1880.

VOLUME XLI
Number 21.

Railroads and Progress.

The growth and advancement of the United States is in no other way brought home to our English cousins as in the increase of railroad facilities. They send us thousands of tons of rails, and when they see the combined rail mills of America and Great Britain unable to keep up the supply, they know we are growing. The award of a contract, on American account, to the world-famed Krupp, of Essen, for 25,000 tons of steel rails, opens their eyes still further, and the award of this contract has drawn out many comments from English sources. As contractors find it difficult to procure early deliveries of rails of American manufacturers, they are compelled to resort to the rail mills of Great Britain, Belgium and Germany.

These facts stand, moreover, as proofs that our revival of business is not due to speculative or transient causes. Railroads are being built in every direction. The great West is being opened, settled, civilized and expanded. The locomotive is moving into every corner of the land. The prodigious increase which is constantly taking place in the United States by births within this country, and by accession from foreign sources, ensures a continuance of this progress, and exercises a marvelous influence on the whole country. New sections must be opened up and settled. New towns and villages will spring up, new railroads will be built and new resources be developed. The Eastern States are already well filled up, and this overflow of population must come into the great West where there is land and room for all.

The railroads must keep up with, if not ahead of this march of progress. To do this, they must be rapidly extended. Railroad building has become a science with us. We don't pretend to build with the solidity or permanence of the European road, but we build rapidly and overcome obstacles which would elsewhere be considered insurmountable. Moreover we have very long lines under single managements. This is of course only possible in a big country like this. As an example, we may cite the Central Pacific railroad, the report for which, for the year ending December 31, 1879, has recently been issued. This company worked, during the year, an average of 2,318.92 miles of road, the mileage standing at this close of the year as follows:

Main line, San Francisco to Ogden, miles.....	833.23
Oregon branch, Roseville to Redding.....	157.60
Visalia branch, Lathrop to Goshen.....	146.08
Oakland and Alameda short branches.....	14.68
San Jose branch, Niles to San Jose.....	17.54

Total Central Pacific.....	1,213.13
Northern and San Pablo and Tulare.....	163.65
Berkeley branch.....	3.84
Oakland Pacific.....	115.44
Amador branch.....	27.20
Stockton and Copperopolis.....	49.00
Los Angeles and San Diego.....	27.60
Los Angeles and Independence.....	18.83
Southern Pacific.....	550.25
Southern Pacific of Arizona.....	182.81

Total.....2,349.75

On the Southern Pacific of Arizona above referred to, the passenger trains are now running as far as Lordsburg, which is 407 miles from Fort Yuma, or 220 miles farther than the above table shows. The total number of miles the company has at present in operation is 2,575, and the work of building southeastwardly is still going on vigorously. Up to Sunday, the Southern Pacific railroad track was 8579-100th miles in New Mexico, being that distance east of the Arizona line.

CHEAP MINERS.—It is reported that a number of men were engaged in this city this week for \$1 a day and board, to work in a mine 150 miles from Tucson, Arizona. The fare to Tucson was paid, but deducted from the first month's pay. Thirty-six men were engaged on these terms, they expecting to walk from Tucson to the mine. It is hardly probable that the men will work for such wages very long, even if they get to the mine. It is more than likely they will desert by the time they get to Tucson.

Expenditures on Claims.

The Commissioner of the General Land Office has written a letter to Senator Hill, of Colorado, announcing an important ruling in regard to the present law concerning the annual expenditures on mining claims. This question submitted by Senator Hill, in behalf of one of his constituents, was, in substance, whether the department would recognize, as a compliance

with the act of last January, an expenditure of \$100 worth of work between Oct. 10th and 20th, 1879, upon a mining claim located Oct. 1st, 1879. Commissioner Williamson, in reply, writes as follows: "Under the act of May 10th, 1872 (Sec. 2,324, Revised Statutes), the annual expenditure for improvements was due within each year, commencing with the date of location, except in regard to claims located prior to the enactment of that law, the annual expenditures upon which were made due by Jan. 1st, 1873, and annually thereafter. The purpose of the amendatory law of Jan. 22d, 1880, was to secure a uniform period within which the annual expenditure should be required on all locations, and it provided that such period should commence on the 1st day of January succeeding the date of location of such claim. It therefore follows that a claim treated Oct. 1st, 1879, requires the expenditure of \$100 worth of labor or improvements thereon within the calendar year 1880, and that whatever may have been expended during the year 1879 will not answer the requirements of expenditures in 1880. It also appears, by reason of the change made in the requirements of the act of May, 1872, amendatory of the law of last January, that a claim located on any date subsequent to the 1st day of January, 1879, requires no further expenditure during the remainder of that year than is made necessary by local laws." The Commissioner adds that he finds he has inadvertently signed a letter indicating a different construction of the section aforesaid, but the conclusion now given has been reached after careful consideration, and will control his official action.

SUIT has entered in the Superior Court, Los Angeles, by A. A. Cohn, attorney for the Atlantic and Pacific Railroad Co., against the Southern Pacific Railroad Co., for the recovery of lands in Los Angeles county alleged to be unlawfully held by the defendant, and for rents since August 1st, 1876, amounting to \$250,000.

Mechanical Drawing.

The education of a first-class mechanic is incomplete without a thorough knowledge of mechanical drawing, and other branches inseparably connected with it. An inability to express ideas upon the drawing board is a sad drawback to a mechanic. There are hundreds of machinists who would be, at this moment, poring over their drawing boards, inventing, scheming and

improving, had they studied and acquired a taste for practical drafting. In the workshop, the practical part of a mechanic's business is to be learned. No one can claim to be a practical engineer and draftsman, whose practices did not commence in the workshop. Here he can employ observation, thought and inquiry, make himself acquainted with the mechanical powers, learn the nature and the manipulation of metals; here he can acquire manual skill in working and fitting the various details of steam engines, boilers, tools, machinery generally.

But it must be remembered that the scientific book and the drawing board must go hand in hand with practical experiences. A first-class mechanic ought not to be able only to work practically, but also to design practically; he should be able to express his designs, improvements or inventions upon paper.

We are led to these remarks by the perusal of a little work on "Practical Drafting," by T. P. Pemberton, published by the Industrial Publication Co., N. Y. This little guide contains practical instructions in drafting for machinists, mechanics, apprentices and students. The instructions are in plain, comprehensive terms, such as a teacher would use to his pupils. The author has devoted his attention to this practical rather than to the theoretical part of the subject. The instructions may prove useful to many engineers and mechanics, the illustrations and explanations being simple, plain, and to the point.

THE *Times'* Quebec special says: Mills and considerable quantities of machinery are being shipped to the Beaucegold mines, Canada. A company with \$500,000 capital was organized in Boston in one day, and a New York gentleman paid \$60,000 for 50 acres on Gilbert river.

THE bullion shipments from Silver Reef, through Wells, Fargo & Co., from Oct. 28th, to Nov. 3d inclusive, aggregate the sum of \$20,006. Total shipment for month of October, \$105,411.18.

Alaska Mines.

When Alaska was purchased by the United States it was supposed by many that rich mines existed within its borders. Numerous prospecting expeditions have been organized, but the country has not been very thoroughly prospected. There are some gold quartz mines near Sitka, on which work is at present suspended, but it is said operations will soon be commenced on a large scale.

There are several localities in Alaska where a more thorough prospect may develop something of value. Messrs. Bean, Duncan and other miners, who went through Chiloott to the interior of Alaska and the head waters of the Yukon last summer, returned on the 23d of October. They penetrated about 200 miles into a region of vast plains, interspersed with ranges of low mountains, and rivers connecting numbers of lakes. They are said to have found gold in many places, and the deposits indicated rich placer belts in the mountains from which they came, but the formations did not show with much certainty the direction in which they lay. Much of their time was lost from ignorance of the country and want of correct maps, but they think the knowledge they have now acquired will enable them to find the placer diggings easily next summer, and they intend to try it again. The Yukon is a mighty river. It drains an immense extent of territory which is yet to be explored. The expeditions there this year naturally looked more for placer mines than anything else, rich placers being always the dream of the miner. When they find them they will then look up the quartz. It may be that extensive beds of gravel may be found somewhere about the headwaters of the Yukon. The men who were there this year will go back next spring, with better prospects, their experiences of this year having given them a good knowledge of the country.

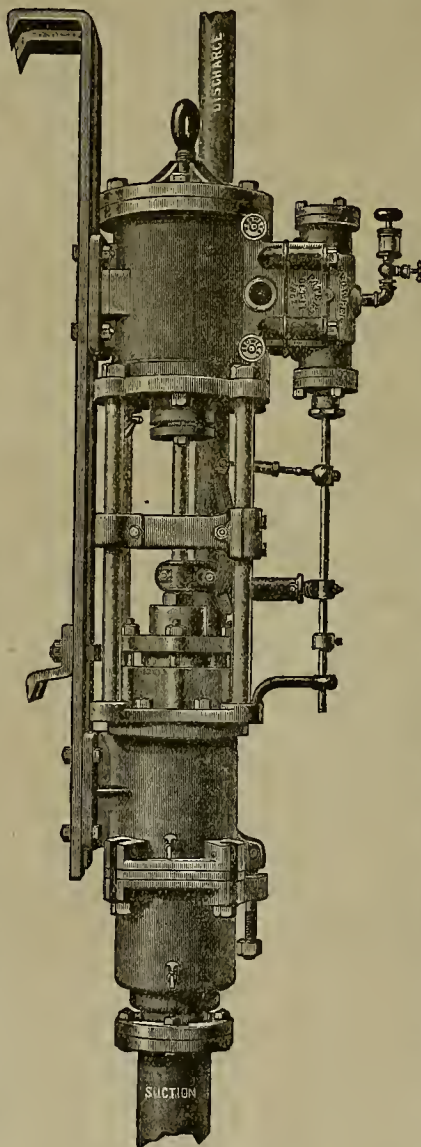
A New Vertical Sinking Pump.

We illustrate here with this new Knowles' vertical sinking pump of the bracket plunger pattern. Different sizes of this style are made. A ten-inch cylinder, five-inch plunger with ten-inch stroke weighs 1,000 lbs. This size is six ft. in length and occupies a space in the shaft 22½ by 15 inches.

The dogs shown in the engraving are made to hook on to the shaft timbers and support the pump. The lower dogs are adjustable. The plunger may be got at very easily, by unlocking and moving the casing back on a bolt, which serves as a hinge. This style of pump is a very handy one for sinking, and Messrs. Parke & Lacy, the agents, have now a number of them on the way out here for use in mines in this State.

Z. L. WHITE, formerly the mining correspondent of the *Tribune*, tells the following story which he heard in Colorado: A man living at Colorado Springs was desirous of making a sudden fortune, and employed an old miner to help discover mineral in the mountains about Pike's Peak. When they had their prospect hole all ready, they employed a mining expert to examine and report upon their property. He gave an elaborate description of the geology of the country surrounding the mine, and of the rock in which it was found, but when he came to discuss the origin of the pay ore, he remarked that some veins were charged by sublimation and some by precipitation, but that the ore under discussion was the first he had ever been called upon to examine professionally that bore unmistakable evidence of having been charged with a wheelbarrow.

A LARGE quantity of telegraph wire, says the *Chico Record*, was received at the railroad depot on Monday for the Jackson Mining Co. The new line will be constructed from the Sierra Lumber Co's. mills, near the Sutton house, to the mine on Deer creek, a distance of about 15 miles.



KNOWLES' VERTICAL SINKING PUMP.

The Remedy for the Phylloxera—No. 3.

I pass now from the determination of the injury of the bisulphide of carbon, which was the last subject considered, to this resistance of the vines to the same. The first experiment made with the bisulphide of carbon destroyed the subterranean colonies of phylloxera, but gave discouraging results with respect to the vine itself. M. Cronet, at Sainte-Foy-de-Lognes (Var.), was among the first to apply the bisulphide, pure, with vines 6x2 ft. apart. He injected the substance in the corners of a quadrangle about each vine, placing 5 grams in each of 4 holes 7 inches from the vine. The result is easily guessed—15% of this vines were lost in the operation. The next was M. Guet, at Solliès-Pont (Var.), who destroyed 23% of his vineyard by improper application of the bisulphide. Others made equally bad attempts, and these unfruitful efforts gave rise to much discouragement respecting this insecticide. This experience goes now to show the necessity of determining by accurate scientific experiments the proper method of applying the bisulphide, and then of conforming exactly to the rules deduced from such experiments. The experiments of the *Comité* to determine its effect on the vines were as follows:

On the 24th of June, 1877, 150 infected vines were treated with the bisulphide at the rate of 25.40 grams per sq. meter. Of this number of vines 72 were already badly reduced in strength, 46 a little better and 32 offering still some appearance of vigor. Three days after the injection of the insecticide, and continuing 7 or 8 days, the leaves of the vines most reduced exhibited a yellow appearance; the most vigorous exhibited no sign of the effect of the vapor. By the 12th of July they regained their natural green color and awoke from the influences of the drug. In this lot there were two classes of vines, one of 4 years of age and the other class 40. Now of the older, many of which were almost entirely gone, a few dropped off entirely, being too far gone to be resuscitated at all. Not so with the young ones, they all revived, proving that young vines will stand the bisulphide better than old ones, and that only those vines completely gone have to fear the ordinary dose employed. In very rare cases, when the vineyard is rendered feeble throughout, the bisulphide must be thoroughly distributed and the dose diminished slightly. It is certain that with the ordinary quantity, the proof is terminated as to the continuance of the vine in from 8 to 10 days. Again, a determination was made on an apparently healthy vineyard, but one which was badly infested with phylloxera. A number of rows of vines for this purpose were divided and apportioned for the receiving of different quantities:

Two rows received 26.70 grams per square meter.	
" " " 53.30 " " " "	
" " " 80.00 " " " "	

The application was made on June 23d, and all on the same day.

Of the first two rows, viz.: those to which were applied 26.70 grams per square meter, only one vine was without grapes. Eight days after the injection this weakest one appeared badly withered—the others not even changing the color of their leaves. After 20 days this withered vine came forth with new shoots and leaves, vigorous and well. Of the second two rows, viz.: those receiving 53.30 grams per square meter, the vines had, before the treatment, an irregular appearance—some strong, others more wasted and destitute of grapes, and still others quite bad. Five days after the injection of the bisulphide a pale tint appeared, showing that the leaves were sensibly affected by the bisulphide. One vine, worse than the rest, was sensibly withered. Five others a little stronger appeared quite yellow. Four days after this there continued a striking difference between the weak and strong vines, the strong vines not being distinguishable from those not treated, and the others continuing to suffer; three of them withered completely. In 30 days more these last branched out with a new growth and returned to health and vigor. The last two rows, viz.: those receiving 80 grams per square meter, were, before the application, irregular as the second two rows. Here the yellow color came on rapidly and continued intense throughout for 17 days. Many of the young branches were completely withered and even some of those on the strong stocks. The vines of medium vigor lost many leaves and the grapes dried up. Five of the poorest were, to all effects, completely gone. Twenty-four days after the yellow color had disappeared from the strong ones; on the others it continued 36 days. One of the five which were apparently dead finally put forth new sprouts and leaves.

This seems to be as far as we need go with these experiments, for it will never become necessary to apply so much as 80 grams in a single dose, and we will now see how it affects the leaves when coming into direct contact with them, as when it is to be applied in summer. The barrel of bisulphide placed in the vineyard has been known to kill those vines so situated as to receive the vapors each time the injector is filled. This, when observed, led to the following experiment: When 10 grams are placed in an open hole beneath the green vine, the single phenomenon which appears, is the withering of the few leaves which are in immediate contact with the orifice—this, in the

month of June, when the fumes are most energetic—now, with the orifice closed, as is done in the practical working, the little which comes upward works no injury at all to the vine, being immediately taken off into the open air. The question has arisen: does the carbon bisulphide arrest the functions of the vine only, or does it poison it by absorption? From what precedes, and from experiments directly for this determination, the inevitable conclusion is, that though the vapors be very abundant, they only suspend the absorbing function of the vine, and do not act as poison. This chapter, which ends the experimental work on a small scale, is closed with the following, as translated from the French:

"As a result, we have found that the subterranean diffusion of the vapors of carbon bisulphide are as energetic and effective as we could wish, and, furthermore, the vine is shown to be little susceptible of the influence of the vapor. Finally our experimental determination of the coefficient of the insecticide indicates that the doses or amounts of the re-agent recommended by the *Comité* must in every case, if they are properly applied, bring about the desired mortality of the terrible root grub or phylloxera. It is seen that successive treatments, methodically carried out, with the bisulphide will produce the required results."

To complete the examination of the first part it becomes necessary to note the results of experiments on a large scale. The space here given does not permit of all the details of those experiments, and I will, therefore, confine myself to the most important facts, and must be excused for stating them in a brief manner:

Cap-Pinede, a Marseille.—Here was a vineyard which had been badly infested since 1870, consisting of five acres of 60-year old vines. The roots of the vines were mostly withered and dried up. In the winter of 1876, the chloride of potassium had been unsuccessfully applied, and the following winter found it about to be abandoned. The bisulphide was tried, being applied in strict conformity with the rules previously deduced. The results are expressed as follows:

"We have the right and feel in duty bound to say that, from our experience at Cap-Pinede, we have attained the desired result. Those who have since visited the vineyard are struck with its appearance, and surprised to find that the treatment has been so effective that there is not a single phylloxera on the vines, nor does so much as any trace of them appear. This result has been obtained only by careful attention, which is necessary to render the remedy effectual."

Le Canet, near Marseilles.—A large vineyard about to be abandoned; was subjected to the proposed treatment. A small portion was left untouched, to better note the effect of the remedy. On the 12th of March treatment was begun. The whole quantity of bisulphide used was 30 grams per square meter, with an interval of six days between the first and second injection. An additional dose was applied subsequently, but this was proved afterward to be entirely unnecessary. On examination after the first application it appeared that most of the phylloxera were dead, and scarcely a single one was to be found on the roots. After the second dose it was absolutely impossible to find a single one on the vines even with the very closest search.

At Saint Menet similar results were obtained; likewise at Le Crissand, near La Renne, the results of which last are particularly valuable as demonstrating the superiority of the pure bisulphide over its mixture with oils, etc. A vineyard of 3,000 vines, all badly phylloxered, was divided in four sections, and denominated respectively A, B, C, D. Treatment was had on the 4th of July, 1878, as follows: A received 18 grams per square meter in a single dose; same amount applied to B, but in two doses, with an interval between of eight days; D was treated with a mixture of equal parts of green oil of anthracene and bisulphide, 18 grams per square meter in all; and to C the common oil of anthracene and bisulphide in equal parts was applied at the rate of 72 grams per square meter. In A some of the most feeble vines drooped a little at first, but soon recovered again. On the 4th of August there were found many parasites in D, scarcely any in C, and some in A. In B the phylloxera were all gone on Dec. 20th. When the leaves had disappeared from the vines, these same applications were repeated. The results were: On D were found some; on C about two-sixths of the vines still possessed the phylloxera. In A six vines out of the whole were found to possess the bug still living; on B all had disappeared. A vineyard made up of vines from all parts of France was treated according to directions, and five days after the second injection not one insect was to be found.

This completes the experiments of the company, and now follows the experiences of the viticulturists in carrying out the directions of the *Comité*. I intended to give some of these, but as they are very long, and as their results conform so exactly with those already had, I will pass them over, only remarking that wherever the directions were conforming to strictly, the results were as complete as could be wished. These results would be greatly interesting to and would accrue to the advantage of those who, being able to read French, can study them closely; and I should advise those who are able to avail themselves of all the contents of this latter part of the report, which, to all effects, beautifully proves the complete practicability of the results already given.

Throughout this work I have confined myself strictly to the results of the *Comité*, and where I could, I have given their experiences in detail. These being clear, definite, accurate and authentic, we may, as far as investigation has yet gone in California, namely, that of proving the complete identification of the insect with that of France, deduce conclusions, each one to

satisfy himself, and I feel convinced that the majority of those sufficiently interested in this subject to become the reader of these articles, will arrive at the logical conclusion which Prof. Marion has enunciated, viz.: That we are in possession of an efficacious method which has resisted a practical proof, that which is proof only and alone.

What will be the Cost of the Bisulphide?

Now that we have concluded as to the efficacy of the bisulphide, the next question which arises is: What will be the cost? The materials from which the substance is made are sulphur and carbon in some available form; the main principle of their combination is simple, but owing to the poisonous nature of its vapors and to the easy volatility of the liquid, together with its ready explosibility, there arises considerable expense incident to the condensing, storing and transportation. It is stored and transported in heavy iron barrels, the expense of which becomes considerable. In consequence of this it is evidently impracticable to import the bisulphide—it must be made here. From Eastern manufacturing chemists, the least it can be delivered on board the cars there is, counting the cost of the barrel, which is two cents per lb., 11 cents per lb. Add to this the freight cost and we are precluded from its use unless manufactured here. With the advantage of returning the cask or iron churn, the bisulphide can be manufactured here and furnished to the vinegrowers of this State at eight cents per lb., to be transported at the cost of the consumer. The means adopted here in selling the bisulphide will be identical with those in France, viz.: On ordering a lot a deposit will be made as security for the barrel which, on its return in good condition, will be refunded to the purchaser. This then, gives it to the vinegrowers at eight cents per lb. Now, making our estimate on this according to directions for use, previously deduced, we have the following as the cost of the bisulphide of carbon: 32 grams per square meter, the greatest amount necessary, if divided between two applications, to totally extinguish the phylloxera, is equivalent to 235 lbs. per acre; this at eight cents per lb. makes a cost of \$22.80; or, again reckoning for each vine, supposing our vines 6½ ft. apart each way, which makes about 1,000 vines per acre, we have per vine 4.56 oz. at eight cents per lb., which makes a cost of \$2.28 cents per vine. It must be borne in mind, that although we have made an estimate per vine, the vapor is not to surround the vine only, but to completely fill the whole body of the soil between the vines, as well as at its tap roots, in order that not one of the insect shall escape its effect. For vines at different distances apart, different rules must be observed for dividing up the quantity per acre; accordingly these will be determined and tabulated, and will then go with the directions for use, etc., which accompany each barrel. The smaller expenses I have not entered into here, they being so inconsiderable, and differing in the different localities.

The application is by means of an injector. This consists of a steel tube pointed at its lower end and attached to a zinc tank above. The whole is of a convenient length and has a cross-piece for a handle above the tank; below the tank and attached to the steel tube is a projection on which to apply foot power in inserting the instrument into the ground. When arriving at the proper depth a hutton on top is struck sharply with the hand, which, by means of an arrangement within, forces out from the bottom end of the steel tube the amount required for each injection. Care is required in the filling and use of this instrument, but any ordinary workman can manipulate it without trouble. The work is done very rapidly. This instrument costs, in France, 40 francs, or about \$8. These will be had at the manufactory of the bisulphide to be either sold to the user or rented. The plan is to have the bisulphide ready for sale shortly after the 1st of December, in order to make use of the two months most favorable to its application, viz., December and January, or later if necessary; but in all cases when the ground has not been recently plowed or worked.

The works are to be erected between West Berkeley and San Pablo, in some spot convenient for shipment by water and care; its transportation will be in iron barrels, with quantities to suit. It is expected that it will be not only applied as an insecticide, but that its application as an exterminator of rodents will be rendered equally feasible by the low price of 8 cents per lb. The bisulphide may answer the purpose in killing the ground squirrel and gopher that it did in Australia and New Zealand in exterminating the rabbits, which, without this, rendered it impossible to produce any vegetation. Its application to killing vermin and insects generally will doubtless be hailed by farmers as a great benefit.

The bisulphide, although explosive when mixed with air, boiling at a low temperature, etc., if carefully handled is perfectly safe, as evidenced by its use in France. The first year of its use, there were 432,000 lbs. distributed about the vineyards of that country, and not a single serious accident happened—all owing to their care in following the directions.

The writer in closing this series of articles wishes to thank Mr. Chas. Whetmore for the use of his library. I am also under obligations to Prof. Hilgard, of the University of California, who has watched this work with interest, who has rendered much valuable advice respecting the application of the bisulphide to California and who has kindly volunteered to render any

assistance which may become necessary in the manufacture, and in applying the reagent.

The vinegrowers, of Napa valley, in the meeting of the Vinicultural Club, of St. Helena, on the 6th inst., took active means to introduce the bisulphide by resolving to recommend its use to all the viticulturists as the best insecticide for the phylloxera; and farther resolving to do all within their power to encourage this, the first manufactory of this chemical on the Pacific coast. By reference to the *St. Helena Star* for Nov. 13th, full particulars of this meeting may be had. The writer of this article will be glad to furnish any further information regarding this question of the phylloxera, or anything in relation to the bisulphide of carbon to any one who may address him.

JOHN H. WHEELER.

530 Cal. St. (Room 3), San Francisco.

Debris Work.

Completion of the Yuba Dam at Marysville—A Success Predicted.

The Marysville *Appeal* contains an interesting account, in detail, of the debris dam across the Yuba, at that point, which was completed on Nov. 3d. After sketching the origin of the work and its early progress, the *Appeal* says:

Turning the Yuba river and filling the gap in the otherwise completed dam, through which the river has been permitted to run, was looked upon as one of the most difficult portions of the work, and it has proven so. The hydraulic mining companies along the Yuba, in order to reduce the volume flowing to the dam, ceased, on Saturday, the running of water into the river, and have been bolder back all they could by means of their reservoirs. The effect was noticed at the dam Sunday evening. It was expected that the gap could be closed on Tuesday, and the companies above were not to restrain the river after that day, but the work not being sufficiently advanced, they were then notified to hold the water until to-day. On Tuesday, the construction of a brush wing-dam across the river a quarter of a mile above the gap was commenced. Its object was to turn the river northward over certain high land to the low land on the north side. Another large force was kept filling the gap with brush and staking it down for foundation for the mattress. The force was kept at work during the night.

Yesterday the wing-dam had been effective enough to turn a portion of the river in the desired direction. This stream going across the sands struck the brush-dam about 10 o'clock, at a point about half a mile from the wing-dam and one-third of a mile from the gap. The heavy north wind kept driving the water back toward the channel, but the wing-dam was increased in height, and faced with sand bags that forced the water to cut its way northward to the low land. By the middle of the afternoon half the river was running that way, and the volume increased steadily until night. Where it struck the dam there was a strong current that did no harm and ran along the scraper ditch to the low places, which began filling. There was no seepage, and it was apparent that there must be several ft. of water piled up against the dam before there could be seepage or percolation through the brush. Seepage is what is expected, and will do no harm. The force worked last night, and to-day every man will be busy. It is expected that the gap will be crossed with brush and mattress, and some layers of logs be put on to-day, and the work be finally completed to-morrow. At noon to-day the water will probably have filled all the low places, and will begin to make its way through the brush at the north end of the dam. This stage of the proceedings will be watched with interest.

It is claimed for the dam that when the water is at flood height, it will slip through the dam and flow over it all along the crest at a depth of not more than one ft., and the fall will be broken by the lower ends of the logs. It is calculated that the water coming into the still pool will lose its velocity and deposit the material which it carries into the reservoir, and passing down the river will be able to cut out the channel below the dam. Much debris will pile up against the dam and gradually raise the bed of the reservoir to the height of the dam, but at the same time a new grade proportionately high will form and extend back up the river for miles, and all the addition thus made to the dam only increases its strength and solidity, and reduces the pressure on the slope of the dam proper, and it will form a solid hill in the river. The area of the reservoir, it is roughly calculated, is sufficient to hold 75,000,000 cubic yards of silt, and be from one to three years in filling. On top of this dam and the earth that will in time fill up to the crest, another dam, when necessary, can be constructed, it is said, at one-fifth of the cost of the present one, because the main cost was in the excavations and heavy foundations that will not be needed next time. Then, too, by condemning a valley south of the reservoir, it is claimed, by good authority, the storage capacity could be increased more than three-fold. At any rate it is a matter of congratulation that the work has been about completed under favorable auspices. The test will come this winter.

A dispatch to the *Call* yesterday says that the river was turned into its former channel late last night, and satisfactory progress is being made to complete the dam. No fears are entertained, but that the dam will be a perfect success.

MECHANICAL PROGRESS.

"Arguzoid"—A New Alloy.

"Arguzoid" is the name of a new composite metal which has just made its appearance in Glasgow, and even with the limited knowledge which we at present possess of it we are led to anticipate an important future for it. It is the invention of a gentleman well versed in the mixing of metals, and who has for many years been intimately connected with the oldest established firm of bell and brass foundries in the city of Glasgow; but the principal introduction of the composition in its commercial phase has been relegated to Messrs. Thompson, Sterne & Co., of Glasgow and London. In appearance it approaches silver nearer than any other metal or composition we have seen; is even whiter than a nickel-plated article, and in fact there is but the slightest shade of color departing from the white, that enables it to be detected from the more precious metal. At present it has only been introduced as a cast metal, being run into ingots, from which again it is remelted, and cast into any article required. It hammers well, and arrangements are now in progress to roll it into sheets. It is about half as much again in price as brass, is cheaper than nickel-plating or electro-plating on brass or copper, and has, besides, the unquestionable advantage of being solid throughout.

We have had an opportunity of seeing the metal in the ingot, in its hammered state, and of examining several manufactured articles, such as bath fittings, spirit-cocks, gas-brackets, carriage-handles, etc., in their finished state, and a nearer approach in appearance to sterling silver it would appear to be almost impossible to produce. Its cohesive strength is only surpassed by silver itself. Brass breaks at 10 tons pressure, phosphor bronze at about 14, while arguzoid requires nearly 16 tons before it succumbs. In ductility it is similar to brass, and the only point on which any doubt at present rests, is as to its powers of withstanding atmospheric changes as regards its color, but from experiments so far made, no fear is entertained by the inventor on that point. Its capabilities in this direction are, however, soon to be put to a severe test, and, if it passes through this ordeal scatheless, an immense field for its use in one direction alone will be open to it. One of the Cunard Co.'s steamers is to be fitted up entirely with arguzoid fittings. It is well known that nickel plating has been tried for ships and proved a failure, the action of sea-air and water completely destroying its appearance in one voyage. Plating with silver is necessarily costly and requires much cleansing. Brass is open to the same objection as regards cleaning, and is not considered good enough for high-class vessels. It is almost impossible to contemplate the revolution this composition will effect should further experiments confirm our present impressions, and we look forward in common with the inventor with interest to the result of his important invention. —*Ironmonger.*

IMPENDING ABOLITION OF PUDDLING.—Recent information from Europe concerning the dephosphorization process of converting pig-iron, furnished by M. Pourcel, of Terre Noire, France; Mr. Pink, of Hoerde, Westphalia; Prof. von Tunner, of Leoben, Austria, and other metallurgical experts, renders it probable that the laborious and unhealthy process of puddling will be shortly superseded. These and other eminent men differ as to the precise nature of the product of the pig-iron dephosphorized in the Bessemer converter; but all unite in regarding the material so produced as being certain to render puddled iron almost unnecessary. The ingot iron or steel made from phosphoric pig in the Bessemer converter is malleable, will weld, and bears severe tests for ductility, contraction of area, etc. This being the case, finished iron should be materially cheapened when the process has made greater progress. In Germany, dephosphorization is conducted on a large scale, and new works, with a total capacity of 600,000 tons per annum, are erecting there and elsewhere on the continent. —*Ex.*

IMPROVED ROLLING MACHINES.—Mr. William Harris, of St. Louis, has made some modifications in the construction of three-high sheet rolling mills which enable the rolling of sheets of No. 26 gauge, while in the ordinary mill No. 18 is generally the lightest which can be successfully turned out. The three rolls are placed one above the other, the top and bottom roll being smaller than the center roll. The center roll, under the Harris patent, is hollow, and a continuous stream of cool water passes through it, so that while doing twice the work of either of the others, it remains at a uniform temperature and prevents any expansion, the baneful effects of which any manufacturer understands in the breaking of rolls, buckling of sheets, delay in stopping to cool down, etc.

HOT BEARINGS.—It has long been known that sulphur cools a hot bearing, but the reason why is doubtful. Von Heeren states that the fine metal dust formed when a journal runs hot, and which strongly acts upon both journal and bearing, forms a sulphide with the sulphur. This compound, which grows soft and greasy, does not cause any appreciable amount of friction. Sulphur and grease, in combination, are in regular use on board the steamers of the North German Lloyd's.

Transmission of Power by Gearing and Belting.

The loss of power by transmission through gears has been ascertained to be, for the driver about 1½%, for the driven 1½%, and in the teeth 1½%—making in all about 4½%, when the diameters at the pitch line are eight times that of the journal. If the diameter of gears should be only four times that of the bearing, then the loss of power is 9%, or inversely as the ratio of the diameter of gears to bearings. The weight of gears and shafting have not been considered in this statement; in horizontal shafting, however, the weight has no effect, since the weight of gear is usually less than the pressure upon the teeth. In regard to shafting, the dimensions required for transmitting any given power depend upon the resistance to which it is subjected, the material composing it, and the length employed. It is usually subject to two forces—one force arising from its weight, with that of the pulleys, wheels and tension of the belts—producing what may be called simple flexure or bending. The other force arises from the power transmitted, and is called torsion or twisting.

To avoid undue flexure, the shafting should be proportioned to the simple weight and transverse strain, but, in addition, it must be remembered that the torsion or twisting must be transmitted without danger of rupture to the shafting, and, therefore, the two elements require careful consideration in all calculations, in order to secure permanence and safety. As it is the flexure or bending produced by lateral stress that limits the size of shafting, more than the tendency to transverse fracture, stiffness becomes a more important element than strength, and in all cases wrought iron would, on that account, be preferable to cast iron. Where it is necessary to drive machinery at a high speed, it is a great advantage to run the shafting at a proportionally high speed, as much will be saved in the weights, since much lighter shafting can be used to transmit the same power; besides reducing the friction arising from the unnecessary weight of large shafting. It also economises power that is absorbed by the greater friction. —*Leffel's Wheel Book.*

TO LINE UP SHAFTING.—Hang a nut, or other small weight, over the ends of the shaft by a piece of small twine, so the line passes over the exact center of the shaft, and the nut is within six inches of the floor. Hang at each bearing, or hanger, by pieces of twine, a nut from one side of the shaft, so the nuts are all six inches from the floor. Now stretch a line, one ft. high from the floor, from beyond each of the end lines, exactly touching them. The end lines are plumb from the center of the shaft, and the side lines are plumb from the sides of the shaft. The side lines, when the shaft is in line, must be one-half the diameter of the shaft from the straight line; so move the shaft until the side lines are that distance; then with a short spirit level level up the shaft from end to end, and go over each twice, and your shafts will be exactly in line. This can be done at any time, without trouble or expense. —*Ex.*

CEMENT FOR LEATHER BELTING.—One who has tried everything says that after an experience of 15 years he has found nothing to equal the following as a cement for leather belting: Common glue and isinglass, equal parts, soaked for 10 hours in just enough water to cover them. Bring gradually to a boiling heat and add pure tannin until the whole becomes ropy or appears like the white of eggs. Buff off the surfaces to be joined, apply this cement warm, and clamp firmly.

GREAT DEMAND FOR STEEL RAILS.—It is estimated that the rolling mills which are engaged in the production of steel rails have already received orders for 500,000 tons of rails for next year's delivery. These large contracts for forward delivery are rendered necessary by the fact that the mills are generally so fully employed as to be unable to supply but limited quantities upon new orders; and all indications point to a very large use of railroad iron for the year 1881.

COMPARATIVE VALUE OF WOOD AND COAL FOR FUEL.—It is safe to assume that 2½ lbs. of dry wood is equal to 1 lb. average quality of soft coal, and that the fuel value of the same weight of different woods is very nearly the same—that is, a pound of hickory is worth no more for fuel than a pound of pine, assuming both to be dry. If the value be measured by weight it is important that the wood be dry, as each 10% of water or moisture in the wood will detract about 12% from its value as fuel.

FALLING WATER.—Water in falling is subject to the same laws as other falling bodies, passing through one ft. in one-fourth second, four ft. in one-half second, nine ft. in three-fourth second, etc.; hence its velocity flowing through the side of a reservoir, bulkhead or any vessel, is the same as that of a heavy body falling freely from a height equal to the distance between the middle of the aperture or hole to the surface of water below.

SAWS.—A saw just large enough to cut through a board, will require less power than a saw larger, the number of teeth, speed and thickness being equal in each. The more teeth, the more power, provided the thickness, speed and feed are equal. There is, however, a limit, or a point where a few teeth will not answer the place of a large number.

SCIENTIFIC PROGRESS.

How Much of Nature is Matter.

A correspondent of the Boston Journal of Chemistry, in referring to Mr. Crookes' investigation of his assumed "Fourth State of Matter," asks: "What is matter? What part of nature is included in the term? It does not include mere force, and it does not include mind, but does it include light, heat and electricity, or the thing or principle, if there be one, of which they are manifestations? Is it confined to those things in nature which are subject to the law of gravitation?"

The term "matter" certainly does not include gravitation itself, and gravitation is not mere force. It is impossible for the logical mind to conceive a thing as having a separate potential existence as mere force; the very idea of force is that it is a result of a producing cause. There must be something in nature which produces the force we call gravitation. And there must be something else which produces the antipodal force of radiation. The idea of self-existing motion or force is but another form of the Indian's idea of the elephant on the back of the tortoise, etc. No such ideas are the result of correct logical deduction, or of mental or physical analysis; they are merely results of a mental dizziness to which weak and cowardly humanity is subject when looking into the vast abyss of the unknown. They are phantasms presented by the imagination which the intellect accepts as realities rather than gazing into the unfathomable gulf which yawns before it when they are brushed away. It is the merest speculation to assume anything in nature as ultimate, and such assumptions are treacherous to scientific progress, because when accepted as truth they put an end to investigation.

But considering these forces as original, potential things, and not mere results, does matter include all those things in nature which are subject to the force of gravitation, and exclude all those which are subject to the force of radiation? Accurate reasoning is impossible without exact definition of the terms used, and I have wholly failed to find a definition of matter consistent with some of the received ideas on the subject.

Nature is composed of things which are matter, and other things which are not matter. And obviously the first step in any true cosmic philosophy is to ascertain the line of demarcation between them. Until this is done, scientists, in respect to matter, must remain like colonists on the shore of a continent undertaking a geographical description of it without first circumnavigating it.

Let us first separate things material or matter, by proper terms, from things immaterial or not matter, and then we can determine whether these two classes are inter-convertible. It may be the fact (the analogies of nature in both classes seem to indicate it), that things which we call matter are produced from things which we call immaterial or not matter, especially if matter be limited to things governed by the law of gravitation; and if it be not thus limited, radiant matter is nothing new.

If Mr. Crookes has discovered that what is ordinarily called matter, that is, things subject to the law of gravitation, may be resolved into elements not subject to that law, a great advance has been made into the hitherto unknown. The next step will probably be to demonstrate, that what we call elementary substances are the result of collision in space of the cosmic forces manifested in gravitation and radiation, in much the same way that color and sound are produced, the character of the substance produced being dependent on the nature of the collision,—the gases corresponding to the higher notes in the musical scale, and the metals to the lower tones; and that these "notes from the music of the spheres" are the meteorites which the earth meets in space.

Then we shall want to know what it is in nature which causes gravitation, what causes radiation, and whether there are not other cosmic forces which have hitherto entirely escaped observation.

AN ILLUMINATING COMPOSITION.—Industry thus describes a simple way to produce an illuminating composition. Cleanse oyster shells by well washing, expose them to a red heat for half an hour, separate the cleanest parts and put into a crucible in alternate layers with sulphur; now expel the vessel to a red heat for an hour at least. When cold break the mass and separate the whitest parts for use. If enclosed in a bottle the figures of a watch may be distinguished by its aid. To renew the luminosity of the mass place the bottle each day in the sun, or in strong daylight; or burn a strip of magnesium wire close to the bottle. The sulphide of lime will thus absorb light, which will again be available at night time.

INTERESTING EXPERIMENT.—A simple and interesting experiment in magnetism has been introduced by Prof. Thompson. A thin plate of hardened steel is written upon with a magnetized iron style, and the path traversed by the style is thus magnetized. In order to read what had been written, filings are sprinkled on the plate and the plate is then placed in a vertical position, when, of course, all the filings fall off except those which happen to fall on the part of the plate magnetized by the style, leaving the writing in relief.

Four Comets Now Visible.

There is now the unusual, if not altogether novel occurrence of four telescopic comets in sight at one time; but none of them can be seen with the naked eye. With possibly one exception they are all growing fainter, and will soon be beyond the reach of the most powerful instruments.

The first is the one discovered by Mr. Scharbele, at Ann Arbor, Mich. But little has been reported in regard to this comet. Its position Nov. 4th, was in the morning sky: Right ascension, 5 h., 18.9 m.; declination, south 7° 33'. This is probably a new comet.

The second is the one discovered by Mr. Hartwig, of Strasburg, Germany, and also, independently, the next night, by Prof. Harrington, of Ann Arbor. We made full allusion to this comet in our last issue. Its position on Nov. 2d, was: Right ascension, 18 h., 21.7 m.; declination, north 9° 59'. This comet is supposed to have been seen before, but will hereafter bear the name of its recent German discoverer.

The third is known as Faye's comet, having been discovered by M. Faye, of Paris, in 1843. It has a period of seven and one-third years, and its orbit is almost as well known as that of a planet. Its position Nov. 2d was: Right ascension, 22 h., 53.5 m.; declination, south 0° 25'. This comet never approaches very near to the sun, and is a very faint object, even on most favorable occasions, except to very large telescopes.

The fourth of the series is just now attracting considerable attention. It was discovered by Lewis Swift, at Rochester, N. Y., Oct. 11th. This comet is quite transparent, as stars of the eighth and ninth magnitudes are distinctly seen through its very center as it passes over them. Such stars are only slightly dimmed by the intervention of the material of the comet. Mr. Swift writes: "The new comet which I found on the 11th inst. promises to be one of the most remarkable ones which have recently been seen in this country. Its great size, its slow rate of motion, and the fact that its movements are nearly in a direct line toward the earth, all combine to produce this result."

Mr. Barnard, an observer of Nashville, Tenn., in a communication to *Nature*, says: "It appears large and diffused with a slight condensation, at the middle or the preceding side, with probably faint evidences of a diffused tail." It is either approaching or receding, in nearly a direct line, to or from the earth, and may be seen with a very small telescope. Its position Nov. 2d was: Right ascension, 22 h., 0.0 m.; declination, North 34° 15'. It is moving moderately fast in a northeasterly direction. On the morning of Oct. 21st it followed the fourth magnitude star, α Pegasi, by about 1°. It has been seen with an 1½-inch finder.

ANIMAL ELECTRICITY.—M. Amat, in a recent account of his experiences in the Sahara, states that in that dry region, without insulating himself from the ground, he could often get long sparks by simply passing a pocket comb through his hair or beard. This succeeded best in dry, hot weather, on return from a long excursion over arid plains, the most favorable time being in the evening from seven to nine o'clock. Some of the lower animals, and especially horses, present electric phenomena still more strikingly. On hot summer days one sees on Arab horses long hairs diverging from the middle of the tail. On caressing the tail with the hand, a number of crackling sounds are heard, and if it be in darkness sparks are seen. The electricity liberated by the tails of horses M. Amat finds to be positive. Man, in direct communication with the ground, does not show such an accumulation of the electric fluid as the horse does, and friction is necessary to develop it. The horn of the horse's hoofs seems to act as an insulator.

PRIMEVAL MAN.—Prof. Dawkins has come all the way from England to tell the Boston people, in 12 lectures, what he thinks he knows about primeval man in theocene age. He professes to know something about it, by a study of the rocks, and the flora and fauna of the world. In the miocene stage of the world's history, there was no place for man; but "we will get nearer and nearer the period of man after a while, although we may not at first recognize him as he originally appeared." In this connection the Curator of the Peabody Museum at Cambridge observes, in the 10th annual report: "Dr. Abbott has probably obtained data which show that man existed on our Atlantic coast during the time of, if not prior to, the formation of the great gravel deposit, which extends toward the coast from the Delaware river, near Trenton, and is believed to have been formed by glacial action. From a visit to the locality with Dr. Abbott, I see no reason to doubt the general conclusion he has reached in regard to the existence of man in glacial times on the Atlantic coast of North America."

The phenomenon of the perforation of rocks by sand carried on the wind has been observed in the valley of the Rhone in France. A very violent wind often prevails in the neighborhood of Uzès, and drives large quantities of sand against a band of quartzose pebbles contained in a tertiary soil. The pebbles contain cavities which might be believed to have been made by human hands, but which are really produced by the often renewed friction of the sandy particles against their surface.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Oct. 28.	Week Ending Nov. 4.	Week Ending Nov. 11.	Week Ending Nov. 18.
Alpha.....	41	4	27.45	2.60
Alta.....	3.40	21	2.70	4.10
Andros.....	1.05	90c	80c	80c
Argento.....	60c	20c	30c	40c
Alps.....	20c	30c	40c	50c
Atlanta.....	20c	30c	40c	50c
Armore Tunnel.....	20c	30c	40c	50c
Baltimore Con.....	2.95	2.40	1.80	1.35
Belcher.....	1.80	1.35	1.10	1.70
Belmont.....	1.80	1.35	1.10	1.70
Best & Belcher.....	1.80	1.35	1.10	1.70
Bullion.....	21	2.95	1.70	2.20
Bechtel.....	1.55	1.10	1.35	1.20
Belle Isle.....	55c	55c	55c	55c
Bodie.....	4	3.80	4	4
Benton.....	1.30	85c	1.65	70c
Bulwer.....	1.30	85c	1.65	70c
Boyle.....	10c	5c	10c	10c
Black Hawk.....	10c	5c	10c	10c
Bolivia.....	10c	5c	10c	10c
Booker.....	10c	5c	10c	10c
Caledonia.....	45c	40c	35c	40c
California.....	1.15	1.20	1.30	1.20
Challenge.....	90c	85c	2	75c
Chollar.....	2.80	2.40	2.05	1.70
Confidence.....	4	3.95	3.70	3.60
Con Imperial.....	2.30	2.05	2.65	2.20
Con Virginia.....	2.30	2.05	2.65	2.20
Crown Point.....	1.65	1.20	1.05	1.10
Con Washoe.....	10c	5c	10c	10c
Champion.....	10c	5c	10c	10c
Chico.....	10c	5c	10c	10c
Dayton.....	10c	5c	10c	10c
DeFrees.....	10c	5c	10c	10c
Denny.....	10c	5c	10c	10c
Day.....	10c	5c	10c	10c
Eureka.....	1.30	1.15	1.20	1.10
Excelsior.....	1.30	1.15	1.20	1.10
Endowment.....	1.30	1.15	1.20	1.10
Gen Thomas.....	1.70	1.55	1.60	1.55
Grand Prize.....	1.70	1.55	1.60	1.55
Gile.....	1.70	1.55	1.60	1.55
Golden Ophir.....	1.70	1.55	1.60	1.55
Golden Terra.....	1.70	1.55	1.60	1.55
Goodshaw.....	30c	25c	55c	80c
Gould & Curry.....	4.10	3.65	3.30	3.40
Hale & Norcross.....	32	31	3.35	2.80
Hillside.....	32	31	3.35	2.80
Highbridge.....	32	31	3.35	2.80
Homestead.....	32	31	3.35	2.80
Huachuca.....	32	31	3.35	2.80
Independence.....	50c	40c	55c	40c
Justice.....	90c	75c	1.05	70c
Jackson.....	90c	75c	1.05	70c
Joe Scott.....	90c	75c	1.05	70c
K. K. Con.....	12	12	12	1.20
Kentuck.....	12	12	12	1.20
Kosuth.....	12	12	12	1.20
Keston.....	12	12	12	1.20
Lady Wash.....	30c	25c	35c	25c
Leopard.....	30c	25c	35c	25c
Leviathan.....	30c	25c	35c	25c
Leeds.....	30c	25c	35c	25c
Lee.....	30c	25c	35c	25c
May Belle.....	30c	25c	35c	25c
Modoc.....	30c	25c	35c	25c
Manhattan.....	30c	25c	35c	25c
Martin White.....	30c	25c	35c	25c
McClintock.....	30c	25c	35c	25c
Meadow Valley.....	30c	25c	35c	25c
Mexican.....	30c	25c	35c	25c
Middle.....	30c	25c	35c	25c
Monte Vista.....	30c	25c	35c	25c
North Con Virginia.....	30c	25c	35c	25c
New York.....	30c	25c	35c	25c
Northern Belle.....	30c	25c	35c	25c
Navajo.....	30c	25c	35c	25c
Oceano.....	30c	25c	35c	25c
Ophir.....	30c	25c	35c	25c
Oregon.....	30c	25c	35c	25c
Panther.....	30c	25c	35c	25c
Phoenix.....	30c	25c	35c	25c
Phil Sheridan.....	30c	25c	35c	25c
Potosi.....	30c	25c	35c	25c
Prospect.....	30c	25c	35c	25c
Raymond & Ely.....	30c	25c	35c	25c
Richter.....	30c	25c	35c	25c
Rock Island.....	30c	25c	35c	25c
Rye Patch.....	30c	25c	35c	25c
Rough & Ready.....	30c	25c	35c	25c
Savage.....	30c	25c	35c	25c
Seg Belcher.....	30c	25c	35c	25c
Starr Nevada.....	30c	25c	35c	25c
Silver Hill.....	30c	25c	35c	25c
Silver King.....	30c	25c	35c	25c
Silver Prize.....	30c	25c	35c	25c
Succor.....	30c	25c	35c	25c
Summit.....	30c	25c	35c	25c
Tacoma.....	30c	25c	35c	25c
Solid Silver.....	30c	25c	35c	25c
South Bodie.....	30c	25c	35c	25c
South Standard.....	30c	25c	35c	25c
Star.....	30c	25c	35c	25c
St. Louis.....	30c	25c	35c	25c
Syndicate.....	30c	25c	35c	25c
Tioga Con.....	30c	25c	35c	25c
Tioga.....	30c	25c	35c	25c
Trojan.....	30c	25c	35c	25c
Union Con.....	30c	25c	35c	25c
Utah.....	30c	25c	35c	25c
Vermont Con.....	30c	25c	35c	25c
Ward.....	30c	25c	35c	25c
Wells Fargo.....	30c	25c	35c	25c
Woodville.....	30c	25c	35c	25c
White Cloud.....	30c	25c	35c	25c
Yellow Jacket.....	30c	25c	35c	25c

Sales at S. F. Stock Exchange.

Thursday A.M., Nov. 18.	1340	Sierra Nevada.....	91.29
45 Alpha.....	3.15	635 Silver Hill.....	40c
6340 Alta.....	4.10	100 Utah.....	61.27
300 Andros.....	1.05	190 Yellow Jacket.....	4
310 Belcher.....	1.80	100 Yellow Jacket.....	4
300 B & Belcher.....	1.80	100 Yellow Jacket.....	4
400 Bullion.....	1.30	100 Yellow Jacket.....	4
425 Brilliant.....	50c	100 Yellow Jacket.....	4
225 Con Virginia.....	2.05	100 Yellow Jacket.....	4
270 Chollar.....	2.80	100 Yellow Jacket.....	4
135 California.....	1.15	100 Yellow Jacket.....	4
220 Crown Point.....	1.65	100 Yellow Jacket.....	4
900 Con Imperial.....	2.30	100 Yellow Jacket.....	4
550 O Dorado.....	30c	100 Yellow Jacket.....	4
200 Excelsior.....	60c	100 Yellow Jacket.....	4
150 Golden Gate.....	1.10	100 Yellow Jacket.....	4
350 Gould & Curry.....	4.10	100 Yellow Jacket.....	4
160 Hale & Nor.....	3.35	100 Yellow Jacket.....	4
3105 Justice.....	1.05	100 Yellow Jacket.....	4
110 Julia.....	40c	100 Yellow Jacket.....	4
20 Lady Wash.....	30c	100 Yellow Jacket.....	4
160 Mexican.....	70c	100 Yellow Jacket.....	4
400 New York.....	30c	100 Yellow Jacket.....	4
50 N. Romanza.....	20c	100 Yellow Jacket.....	4
580 Ophir.....	30c	100 Yellow Jacket.....	4
500 Overman.....	35c	100 Yellow Jacket.....	4
30 Occidental.....	1.15	100 Yellow Jacket.....	4
450 Potosi.....	1.35	100 Yellow Jacket.....	4
245 Service.....	2.70	100 Yellow Jacket.....	4
200 Scorpion.....	1.10	100 Yellow Jacket.....	4

WILLIAM HOAR, says the *Tuscarora Times-Review*, is working in the upper levels of the Leopard mine at Cornucopia and extracting a small quantity of ore. He proposes, we understand, to continue the work during the winter. One or two other prospects will be worked during the cold months, but in all probability the population of the once lively camp will be reduced to less than 10 men before Christmas.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co	Nevada	13	1.00	Oct 27	Nov 30	Dec 21	Wm Willis	309 Montgomery at
Albion Con M Co	Nevada	4	25	Sep 29	Nov 3	Nov 22	T B Chisholm	327 Pine at
Alta Con M Co	Nevada	25	75	Nov 3	Nov 6	Dec 27	V Crockett	327 Pine at
Belcher S M Co	Cal	10	10	Nov 10	Nov 13	Jan 7	H A Oberle	419 California at
Benton Con M Co	Nev	4	50	Oct 27	Nov 30	Dec 20	W Watson	302 Montgomery at
Best & Belcher M Co	Nev	19	50	Nov 6	Dec 10	Dec 31	Wm Willis	309 Montgomery at
Champion M & M Co	Cal	5	25	Oct 4	Nov 9	Nov 9	John Crockett	327 Pine at
Caledonia M Co	Dakota	9	80	Oct 1	Nov 11	Dec 6	J P Verdinal	327 Pine at
Caledonia S M Co	Nevada	32	25	Sept 14	Oct 20	Nov 10	R Wegener	414 California at
Con Imperial M Co	Cal	13	10	Nov 3	Dec 8	Dec 29	W Deann	309 Montgomery at
Crown Point G & S M Co	Nev	43	50	Oct 7	Nov 18	Dec 10	James Newlands	327 Pine at
Chollar M Co	Nev	5	50	Nov 9	Dec 14	Jan 4	W E Deann	309 Montgomery at
Eraser M Co	Nevada	16	05	Oct 7	Nov 10	Nov 30	C E Elliott	309 Montgomery at
Hale & Norcross M Co	Nevada	66	75	Oct 7	Nov 10	Nov 30	J F Lightner	309 Montgomery at
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	Dec 10	C Ven Dyke Hubbard	310 Pine at
Maryland Con G & S M Co	Cal	25	Ang 13	Sept 15	Oct 18	Dec 18	E F Farnsworth	222 Sansome at
Mammoth M Co	Cal	2	25	Oct 1	Nov 3	Dec 10	A W Rose, Jr	302 Montgomery at
Monte Christo M Co	Cal	4	10	Sept 21	Nov 1	Nov 29	B Burris	309 Montgomery at
Monro G M Co	Cal	9	50	Oct 13	Nov 19	Dec 9	W H Lent	309 Montgomery at
New York M Co	Cal	24	15	Oct 11	Nov 13	Dec 3	D L Thomas	327 Pine at
Occidental Con G M Co	Cal	6	05	Oct 11	Nov 30	Dec 20	W T Smith	422 Montgomery at
Ophir S M Co	Nev	33	1.00	Nov 5	Dec 10	Dec 30	O L McCoy	Nevada Block
Savage M Co	Nevada	4	1.00	Oct 4	Nov 5	Nov 26	E F Holmes	319 Montgomery at
San Francisco Copper M Co	Cal	6	50	Sept 15	Oct 15	Nov 15	R H Pond	238 Market at
Tellurium G & S M Co	Cal	23	10	Oct 17	Nov 17	Dec 14	J M Litchfield	415 Montgomery at
Union Con S M Co	Cal	15	1.00	Nov 13	Dec 16	Jan 3	J M Buffington	309 California at
Utah S M Co	Nev	32	20	Nov 4	Dec 9	Dec 29	G C Pratt	309 Montgomery at
Yellow Jacket M Co	Nev	39	1.00	Oct 5	Nov 10	Dec 8	Merced Otey	Gold Hill Nevada

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Arizona Prospecting & M Co	Arizona	2	05	Oct 6	Dec 4	Dec 22	C E Travers	331 Montgomery at
Buckeye W & H M Co	Cal	2	02	Oct 21	Nov 30	Dec 20	J L Fields	240 Montgomery at
Belmont M Co	Cal	26	15	Oct 9	Nov 15	Dec 13	J W Pew	320 Sansome at
Crown Point G S M Co	Cal	43	50	Oct 7	Nov 18	Dec 10	James Newlands	327 Pine at
California S M Co	Cal	5	50	Oct 5	Nov 10	Dec 10	E F Holmes	309 Montgomery at
Chlorine M Co	Mexico	2	20	Oct 13	Nov 17	Dec 15	E B Holmes	217 Sansome at
Commonwealth Con M Co	Cal	3	10	Oct 9	Nov 12	Dec 2	C B A Morse	217 Sansome at
Cumberland G & S M Co	Arizona	2	30	Oct 27	Nov 30	Dec 24	J H Griffiths	328 Market at
Day S M Co	Nevada	7	15	Sept 22	Oct 25	Nov 22	J W Pew	310 Pine at
Excelsior G M Co	Cal	13	10	Oct 20	Nov 24	Dec 15	D E Chisholm	327 Pine at
Eagle S M Co	Cal	15	10	Nov 16	Dec 15	Jan 15	J E Byrne	333 Kearny at
Godfrey G M Co	California	5	05	Sept 4	Nov 4	Nov 25	J M Buffington	309 California at
Hazard G M Co	Cal	5	07	Sept 27	Nov 4	Nov 23	J T McGeehegan	318 Pine at
Iowa M Co	Nev	11	03	Oct 13	Nov 15	Dec 6	W M Gillespie	411 California at
Lewiston S M Co	Arizona	3	10	Oct 2	Nov 10	Dec 29	J W Pew	320 Sansome at
Metz Flower G M Co	Cal	9	10	Nov 11	Dec 14	Dec 31	J Morizo	328 Montgomery at
Mt Potosi Con M Co	Nevada	5	25	Oct 12	Nov 15	Dec 6	E A Holmes	316 Pine at
Maryland Con G & S M Co	Cal	2	25	Ang 10	Nov 30	Dec 18	E F Farnsworth	222 Sansome at
Monro G M Co	Cal	9	50	Oct 13	Nov 19	Dec 9	W H Lent	309 Montgomery at
Oro M Co	Cal	6	10	Nov 15	Dec 18	Jan 18	Wm Stuart	320 Sansome at
Real Del Norte M Co	Cal	13	25	Nov 5	Dec 9	Jan 3	C Van Dyke Hubbard	310 Pine at
San Jose M Co	Cal	17	20	Oct 12	Nov 2	Dec 7	A Carrigan	109 Front at
Tuscarora M & M Co	Nevada	7	15	Oct 30	Dec 4	Dec 27	M E Sperring	309 California at
Wide Awake Prospecting M Co	Nev	11	10	Oct 13	Nov 15	Dec 25	C Chisholm	327 Pine at
Wyoming & Dakota W Co	Dakota	3	2.00	Oct 28	Dec 7	Jan 3	Theo Widmann	444 Montgomery at
Windsor M Co	Nev	1	07	Nov 17	Dec 22	Jan 17	C E Elliott	327 Pine at

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Battle Creek Hydraulic M Co	Cal	R L Taylor	230 Pine st	Annual	Dec 6
Elmhurst G M Co	Cal	H Knz	Cor California and Kearny	Annual	Dec 6
Gipsy Q M Co	Cal	Ellis Edwards	320 Pine st	Annual	Dec 15
Swamp Angel G M Co	Cal	Chas W Badger	315 California st	Annual	Dec 2

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50c	Sept 15
Golden Terra M Co	Cal	J K Goodrich	309 Montgomery at	25	Sept 21
Grand Prize M Co	Nevada	E M Hall	327 Pine st	25	Sept 8
Indian Queen M Co	Cal	Grove Adams	Merchants' Ex	10	Oct

MARIPOSA.

DISCOVERY.—*Mariposa Gazette*, Nov. 13: Some Mexicans, it is said, have discovered a rich quartz vein in the vicinity of the Feleclana mine, and supposed to be a continuation of the same vein.

THE GEORGES.—The 2 veritable Georges, McCaffrey and Heiser, have concluded to bunk together again over on Buckeye at a quartz claim formerly worked by them. They are both practical miners, and we hope soon to be able to inform their friends and the public that they have struck it rich.

MONO.

MAMMOTH.—*Mammoth City Herald*, Nov. 13: Since last report tunnel No. 3 has been advanced 9 ft., giving a total length of 1,712 ft. The upraise from this tunnel has been advanced 38 ft.; total height, 100 ft. No. 6 crosscut has been driven 13 ft. The intermediate drift north, 133 ft above No. 3 tunnel, has been advanced 13 ft.

H. L. & M. C. JOINT TUNNEL.—Distance made this week, 29 ft., giving a total length of 1,273 ft. The rock is still hard, but breaking well, and next week's run promises to be the best made in many weeks.

LIEBOW.—Work in this mine is progressing as usual, but work at the arastra is suspended for a time, on account of the water-wheel being loaded with ice.

OLD TIME PROSPECTORS.—Ben Lowe dropped into the *Herald* office on Tuesday last. He informs us that he has completed the assessment work on the Chicago mines, in Indian district, and that he feels greatly encouraged and has high hopes of the future in that section. In company with Budd Harniss, Lowe started off Fresno way on Wednesday, with a view of prospecting in the foothills during the winter season. There are few more determined and patient prospectors than these heron mentioned, and their many friends will wish them luck in their ramblings.

STANDARD CO.—*Bodie Free Press*, Nov. 14: The company has extracted and shipped to the mill, 1,217 tons of ore from the 300, 385 and 550 levels. The average assays for the week is \$25; crude bullion received, 2,639 ounces, and the amount shipped to San Francisco, \$37,950.82. The shaft is now down 53 ft. Work was stopped part of the week to repair the boiler. The east crosscut from the north drift, 700 level, has been run during the week 10 ft.; total length, 55 ft. This crosscut so far has been run in very hard rock.

NOONDAY AND NORTH NOONDAY.—The 212 level—South shafts are furnishing the usual quantity of good milling ore and show no change since last report. The 212 level—The south shafts look well. The south drift on the east prong of the vein is now connected between the crosscuts which were run east from the middle vein and cut the east prong.

EAST CHANCE.—Supt. Graham makes the following report: For the past week our time has been taken up in repairing the tracks, commencing crosscuts and repairing buildings for the winter. A west crosscut has been run 13 ft to the west vein. In running this crosscut we have cut through veins of quartz, mixed with gangue. We have also cut a bore of very hard bird's-eye porphyry at the end of the shaft.

CHAMPION.—The crosscut on the 000 level is now in 203 ft. This work has resulted in showing up some very good veins, which have a strong character and give great encouragement.

UNIVERSITY.—Work in the University is now being confined to the 610 and 665 levels of the new shaft. Drifts are being run on the ledges, and when at a point immediately below the old shaft an upraise will be made to make the connection between the bottom of the old works and the 665 level from the new shaft. It is the intention of the company to explore the large body of ore known to exist in that vicinity.

BOSTON CON.—The north drift, 300 level, has been advanced 10 ft during the week; total length, 260 ft, and they are now running a vein of quartz 23 ft wide. The north No. 2 drift, 150 level, is being pressed forward; now in 100 ft. The ledge continues of the same favorable character.

NEVADA.

NEW PUMP IN THE IDAHO MINE.—*Gross Valley Union*, Nov. 14: A new 14-inch pump has been put in the Idaho mine, reaching from the surface to the 700 level, to take the place of the 12-inch pump heretofore in use, which will increase the pumping capacity about 25%. There are also being set up 2 steam capstans, to aid in setting the pumps and making repairs to them when necessary, and an auxiliary to the big pumping engine when extra power is required. During the extraordinary rains of last April a large amount of surface water had to be contained against, which found its way into the Idaho from the old workings of the Eureka mine, and it was all the Idaho pumps could do to hold the water. In fact, for several days they could not do so, as the pump tanks on the 7th and 8th levels were filled beyond their capacity, and the surface water that escaped out fall below filled the workings of the mine up to the No. 10 level, and interfered with work for some days. By putting in a pump of increased size all the surface water, which is troublesome as far down as a 700 level, can be handled easily, and do away with all danger of flooding the mine. From the 7th to the 8th a 9-inch pump will be continued in use, and the 8th level will be kept as high as possible, as there is any necessity for. The Idaho is now well prepared to contend against all extra water the winter months may bring.

ALPHA.—*Foothill Tidings*, Nov. 12: This mine is said to be looking extremely well. The quartz is paying much better at the mill than heretofore.

BLUE CLEAN-UP.—From 13 days' run, the Blue Tent gravel mining company, on Wednesday, shipped \$25,000 in bullion.

A DIVIDEND has just been declared by the Watt blue gravel mining company, of 7 cents per share, aggregating \$7,000, from the proceeds of a sale of the prospecting machinery.

The Scotts holding works are now all under cover, are large and of very imposing appearance. The shaft is being driven down to the level, and is to be continued by the aid of a Barleigh drill.

SCOTT'S FLAT.—On a visit to the hydraulic mines at Scott's Flat, the other day, we found all the boys at work, getting their claims ready for a winter's run. Hettington & Co. made a most successful run last year we learn, taking out big pay, and now have work well along to start washing so soon as water comes. The Mackeral Bank hydraulic mine, on the north, is getting ready for a winter's run, having a fine bank of gravel in sight that will prospect from top to bottom. This claim has recently been handed to San Francisco parties. Besides these 2 claims, there are several others that are preparing for work. On the other side of the ridge, south, and on the same channel, the Sargent & Jacobs claim is being steadily worked by drifting, and is said to be paying well. On the west side, the Sargent & Jacobs claim is being worked by drifting, and is said to be paying well. Up, owned by a Grass Valley corporation, which is driving a tunnel to tap the channel, and late reports are that they have struck gravel in the face.

PROVIDENCE.—*Transcript*, Nov. 16: The Providence mine is in full operation. This is the biggest mine on the Pacific coast. If worked to its full capacity a 100-stamp mill could be kept running for years, and employment given to 500 more men than are now employed there. A RICH STRIKE IN QUARTZ.—A rich strike in quartz has recently been made by Messrs. Sharp & Baker, on the Baker ranch, near the Sallor Flat hydraulic claim, Blue Tent district. The ledge is said to be about 30 ft wide, and exceedingly rich in free gold. A quantity of it that was ground in a rude stone mortar yielded a large amount of the precious metal. The development has created considerable excitement in the limited circle where it has heretofore been known.

RICH STRIKE IN THE DEADWOOD.—Nearly a year ago the pay chute in the Deadwood mine suddenly gave out between the 320 and 420 levels, and since that time assessments have been the order of the day. We are now rejoiced to announce, however, that the pay chute was replaced on Thursday, and has every appearance of being as rich as ever. It shows a width of 2 ft at a distance of 12 ft. It was discovered by crosscutting into this hanging wall.

New pipes will be added to the pump and the mine will be all right again in a few days. Before the water came in the gravel was the best ever seen in the mine. That mine has a glorious future.

PLACER.

QUARTZ MINING NEAR AUBURN.—*Placer Herald*, Nov. 10: C. H. Mitchell, of the Grass Valley Union, was in Auburn during the first part of this week, and while here he improved the opportunity to visit some of our quartz miners. On returning home he wrote of the district as follows: Quartz mining is becoming an important industry in the vicinity of Auburn, Placer county. There has been more prospecting and more systematic mining work done in that section during the past season than at any previous time. As an evidence of the progress being made in quartz mining, there have been 4 mills recently built in the district, containing in all 37 stamps. The future of quartz mining in the Auburn country is encouraged very encouraging by experienced quartz miners.

PLUMAS.

CASCADE MINE.—*Quincy National*, Nov. 13: This property, situated at the head of Grizzly creek, has recently been a new departure, and active operations are now in full blast. Seven hundred feet of large iron pipe will soon be at the mine from below, and the teamsters are hauling 10,000 ft of lumber from Gila's saw-mill to the mine. A large ditch is being dug, and this calculation is to have the mine ready to run by the time water comes in the spring. There is no doubt but that the Cascade is a good mine, if properly worked, and the present operations indicate that it will now be made to pay.

LAKE WATERS.—A short time ago some samples of Cherokee quartz were sent to New York; not assorted specimens, but taken from a vein 11 ft in width. Assays returned give \$250 per ton as the value. The Cherokee mines are forging ahead rapidly, and give unmistakable indications of developing into a grand property and a bonanza for the owners.

CARRY WATER.—*LAKE CO.*—This company has purchased 2,500 ft of iron pipe for use on the line of their ditch, to carry water past the land slide. New flumes will be constructed for 3 miles, and the ditch will be enlarged to double its present capacity. The distance from the reservoir to the Green Mountain mill is nearly 8 miles, and when the present improvements are completed, the ditch will afford a permanent supply for all time to come, without interruption.

GOLD STRIPS.—A full force of men are doing the regular work on this mine. The Kerr tunnel struck the Goodwin vein a few days ago, which shows fine ore. Both the Gold Stripes mills are running steadily on high-grade quartz, and everything is ready for a successful winter's run.

SIERRA.

MEN WANTED.—*Mountain Messenger*, Nov. 13: Workmen are wanted at Morristown to fit up the American company's claims. Steady work and good wages as long as the weather holds good.

MACHINERY.—The Alaska mining company, of Pike City, has purchased the machinery of the Watt blue gravel company, of Nevada county.

FITNESS UP.—The new company that has taken hold of the old American company's mine, at Morristown, is now fitting up for next season's work. The new Superintendent, Mr. Wheeler, is making every effort to get things in ship-shape before bad weather sets in.

MINING PROPERTY DESTROYED.—*Nevada Transcript*, Nov. 16: Last Tuesday a fire started in the woods near the Savage placer mining company's claim in Sierra county, and, owing to a high wind that prevailed at the time, the property of this claim, in round figures, \$37,000, but the boarding house was burned, besides a lot of timber and tools being destroyed. The catastrophe caused a suspension of operations at the mine. The above information is obtained from a gentleman who came down Sunday morning from the vicinity of the Savage claim.

HOWLAND FLAT.—*Cor. Nevada Transcript*, Nov. 16: The merchants of Howland Flat are laying in the heaviest stock of goods ever shown at the place. Goods are already being shelved in a fire proof store and cellar worth \$27,000 worth of provisions and implements for mining.

BALD MOUNTAIN.—The Bald Mountain gravel claim, Forest City, continues yielding princely revenues. The main tunnel of that mine is now in over a mile and a quarter, with no apparent decrease in the richness of the channel. The tunnel of the Bald Mountain Extension Co., at the same town, is in over 2,750 ft in the mountain (within 150 ft of their own ground), 2,300 of which is in air line, with the remaining distance bending west of north. The last month's assessment, \$1,800, delinquent November 9th, has just been settled in full. This has been the regular levy for the past two months, and a third of the same amount will be ordered by the directors for November.

Up to the present time the total sum expended in the development of this claim is in round figures, \$37,000, over \$1,350 to the interest. Only about \$13,000 of this has been applied on the tunnel, which, if run by the average San Francisco capitalists, at their usual extravagant minimum expense of \$15 per ft, in this county, the outlay would have been \$11,250. Considering thus far not a fair average specimen of the nerve and persistence of our miners, and the fact that the gravel is prospect on an average leads embedded hundreds of feet under mountains of lava, pipe clay, boulders and all other imaginable debris. A few days ago the contractors passed through a quartz ledge, and are now again in very soft bedrock with the water flow steadily increasing, deemed by those whose practical mining experience should be a very accurate gauge, a good evidence of near proximity to a gravel lead whose store of gold is yet an unsolved problem for the future to determine.

TUOLUMNE.

ROUON AND REAT.—*Sonora Independent*, Nov. 13: The Old Rough and Ready drift and hydraulic claim is in a prosperous condition. The company has drifted a great distance and has found the gravel in prospect on an average about 10 to the cubic yard. A large amount of this gravel is in sight, and lumber is being hauled to the ground for the purpose of erecting sluices for washing.

NEVADA.

WASHOE DISTRICT.

The following statements have been made by the Superintendents of the Comstock mines for the week ending Nov. 13:

BELECHER.—The east crosscut on the 2750 level has been advanced 7 ft; in this crosscut a drift shaft has been started and run a distance of 13 ft.

UNION CON.—On the 1000 level the work of repairing the north lateral drift is still continued. On the 2500 level the west drift from the upraise has been extended 10 ft; No. 2 winze has been sunk and timbered 5 ft; the joint Mexican upraise has been extended 10 ft.

MEXICAN.—On the 2500 level the joint Ophir cast winze has been sunk and timbered 5 ft during the past week. A hoisting engine is now being placed in position at the top of the winze.

CON. VIRGINIA.—During the past week 1,107 tons of ore have been extracted from the slopes on the 750 level, of the assay value of \$17.65 per ton. On the 2000 level the joint Best & Belcher winze has been sunk and timbered 6 ft.

CALEDONIA.—Pumps have been run an average of 133 hours per day, consuming 5-6 cords of wood.

OPHIR.—On the 2000 level the north drift has been extended 15 ft. On the 2500 level the joint Ophir and Mexican winze has been sunk and timbered 5 ft, and a hoisting engine is now being placed in position.

SIERRA NEVADA.—On the 2300 level west upraise No. 1 has been advanced 20 ft during the past week; total, 157 ft. On the 2400 level repairs completed and work suspended. On the 2500 level the north drift has been advanced 20 ft; total, 262 ft.

CHERRY CREEK DISTRICT.

SHIPPING.—*Hamilton News*, Nov. 11: A gentleman just in from Cherry Creek informs us that the Star company

ing well and the present output is likely to be increased rather than diminished.

The Exchange mine is running a 5-stamp mill and turning out some good bullion.

This company that recently purchased the Genoa and Tescup has secured important water rights, and will erect a 20-stamp mill during the coming winter.

TAKEN altogether the outlook of Cherry Creek is bright for the future.

The San Jose company, at Eran canyon, has put a force of men to work at their mines, and we hope before long to learn something of interest from that camp.

EUREKA DISTRICT.

A NEW STRIKE.—*Eureka Sentinel*, Nov. 14: Mr. M. H. Joseph brought down last evening some very rich ore from the El Dorado No. 2. The workmen in the mine have been running through iron rock of late, but yesterday struck a vein of ore which will assay over \$100 per ton, square in the bottom of the shaft which they are sinking. It is about 10 inches in width, and indicates an ore body of good size.

THE ATLAS FURNACE.—About the 1st of next month the Atlas furnace will start up on Dunderberg & Williamsburg ore. The furnace will be relined this evening. The work is being done excellently, and when all is ready, Atlas Hill residents can count on a lively dose of fumes for at least 3 or 4 months. About 20 tons of ore per day are being deposited in the bins, and their capacity is sufficient for 1,000 tons. The Dunderberg ore averages about \$100 per ton, and some of it is remarkably rich. Those who have the contract to deliver coal will put it in on the 20th inst., and thereafter according to the demands of the company.

MINING TAX.—*Eureka Sentinel*, Nov. 14: The Assessor's quarterly statement shows the amount of bullion tax paid by the different mines in the district, for the quarter ending September 30, as follows: Richmond Co., \$3,524.71; Eureka Co. Co., \$1,104.60; Ruby Dunderberg Co., \$103.82; Williamsburg Co., \$55.90; Grant Co., \$18.50; Mountain Boy, \$10; Phoenix Co., \$3.20; Jackson Co., \$2.18; Geddie & Bertrand Co., \$2.07. Total amount paid for the quarter, \$4,805.43.

DEBUNK.—At a recent election held by the stockholders of the Bayard Tylor mine, in the East, Wm Liggett was declared the company's choice for Superintendent, and a committee was appointed to come out here and confer with Liggett, and other interested parties, on the best plans for resuming and prosecuting work in the mine.

THE IDAHO MINE.—Mr. Thomas, the contractor in the Idaho mine, has nearly finished the 50-ft winze, but from Mr. A. W. Atchison we learn that work will be continued. They already have a 15-ft vein of low-grade ore in sight, and with such prospects the San Francisco Co. are not the men to let go. Mr. Atchison is busy putting the buildings of the company in repair for winter work, and when the winch-house is enclosed there will be no weather which can effect a stoppage of active operations. The shaft is now 235 ft deep, and 5 men are driving ahead as rapidly as possible. They have a small quantity of very good ore on the dump at present, and the management feel greatly encouraged with their prospect.

THE TITUS.—Hodgdon's now him is doing satisfactory work at the Titus mine, and Mr. Armstrong, the contractor for sinking the shaft, is getting along rapidly with his job. It is now upwards of 100 ft, and the formation is favorable for a "strike." Armstrong employs 4 men, and they put in good hours to develop this property.

ESMERALDA DISTRICT.

RICH COPPER MINES.—*Esmeralda Herald*, Nov. 14: Ludwig & Carter have been sent up from Union district, to work a mine, and are making rich developments. The mine is located about 3 miles from Greenfield. D. H. Jackson, of Virginia City, also has a valuable mine in that vicinity. Up to this time Ludwig & Carter have found a ready sale for all their ore at the chemical works of the Lyon mill and mining company, at Dayton; but in view of the advance in the price of copper and lead, they have a bright future before them. They have the water under consideration, and they deserve all that can be gained from it. The ore works from 30% to 40%.

UNION DISTRICT.

GOOD REPORTS.—*Eureka Sentinel*, Nov. 15: Good reports have often been sent up from Union district, and before long we expect to see some of our most wide-awake citizens take a hand in its mining development. A gentleman by the name of Bennett has been experimenting there on the ores with a little furnace, and his trouble was only from lack of blast. We understand that a very liberal offer was made Mr. A. W. Atchison to put in an engine for the needs of a furnace at the mine, and the gentleman now has the water under consideration. Wood, water and all the auxiliaries for cheap and rapid treatment of ores are about the mine in profusion, and all that the district needs is a live man or two with a little capital.

COLORADO.

PENNSYLVANIA GULCH.—*Fairplay Flume*, Nov. 11: A heavy fall of snow, nearly equaling what lay upon the ground last March, has proved somewhat of an interruption to mine developing. But the intrepid prospectors are surmounting this difficulty and present indications point to a lively month in December. Dewrow & Co., the owners of the gulch, have just resumed their regular operations on that property. They are reported as having refunded \$3,000 for the claim. Col. Henry Howland, one of the largest stockholders in the Black Hawk and Bulger company, whose property is located in this gulch, was in Fairplay the first of the week on business connected with the company, and being interrogated by a reporter, replied that it was desired to get the gulch prospect again in a few days as possible. The difficulty which has arisen over the Boss ledge, and caused its shutting down, may lead to good results after all. Development of the mine was progressing very slowly, and if the parties who hold an option on the mine do not see fit to carry it on any farther, we are given to believe that a good company stand ready to take the claim off their hands and prosecute work on a large scale.

GILPIN COUNTY.—*Georgetown Courier*, Nov. 11: The Hidden Treasure M. Co., of Nevada district, is again raising ore. The stamp mills of the county, as a general thing, are well supplied with ore. A new and rich find of a gold-bearing vein is reported from the southerly portion of York district in Clear Creek county.

SUMNER COUNTY.—The Eclipse is putting on a full force of men. The Eclipse has nearly 5 ft of mineral which is worth \$100 per ton at the mine. The Pittsburgh smelter has now employed about 32 men. Fifty tons of ore is smelted daily, which produce from 10 to 12 tons of bullion. The ore is supplied by the Quail and Aftermath. A number of excellent gold strikes have lately been made on prospects up Pacific gulch. The Anglo-American M. Co., operating up the Silver mountain, is still getting good quality of mineral in the Rose and Texas Girl, which, under stamps, yields 3 ounces gold per ton.

LAKE COUNTY.—The La Plata has declared its 14th regular monthly dividend of 7 cents per share, or \$15,000. The Evening Star Co. has declared its 2d monthly dividend of 50 cents per share, or \$25,000. The Dunkin S. M. Co., operating up the Silver mountain, is still getting good quality of mineral in the Rose and Texas Girl, which, under stamps, yields 3 ounces gold per ton.

PARK COUNTY.—The London company employs a force of 35 men, and has sent to the mill 10 tons of ore, 24 of which have been shipped and the balance piled up at the mine awaiting treatment. The Fannie Barrett mine has employed 30 or 40 mules and horses bringing down ore from the mine and taking back lumber and wood. This looks as if the new company know their business and will work this extensive property.

BOLDER COUNTY.—The work on development of the property of the Fairview mining and improvement company of Jamestown has already been commenced, and will be pushed during the winter. The Columbus is an abandoned telluride mine, upon which Messrs. Schaeffer, Barn-

They have at last been rewarded by finding pay ore. The Slie Co. are shipping a large quantity of \$25 ore to Mr. Nelkir's mill, which is being treated to a large profit. The Maine mine promises to be one of the best leads in the district. It has a large pay vein of good ore that will run from \$30 to \$40 per ton.

CURIA COXETT.—The Bull-Domingo litigation has been settled on terms satisfactory to all parties. Some very rich mines abound in the vicinity of Galena, and only lately a mill run of 65 ounces in gold was obtained from a claim on Democrat mountain. Mr. S. M. Allen has purchased for Chicago parties the Milno Rico and Richmond claims, situated on Round mountain and adjoining the famous Plata Verde mine. Some exceedingly rich ore has been uncovered in the new shaft on the California, at a depth of 45 ft. Work is progressing rapidly on the Silver Cliff Co.'s new mill.

SOUTHERN COLORADO.—A new strike was made last week in Copper gulch, finding Galena at about 8 ft. It is called the Empress Josephine; assays 23 ounces silver. The Unicorn lode, near Ashcroft on Castle creek, owned by the Worthington Bros., of Buena Vista, makes a fine showing. An assay on Wednesday gave a return of 30 ounces of silver and 2 ounces in gold. The Roa Lea, Stem Winder, Last Chance, Elk Horn, Burton, Minnie Lee, Black Tail and Ocean Wave, in Copper gulch, are continuing to show better where developments are made.

IDAHO.

GENTLE EMMA.—*Gwylho Avalanche*, Nov. 12: Sixteen tons of ore are on the dump at the Gentle Emma, which will be between \$200 and \$400 per ton.

LEWIS & STEVEN are taking out ore from the rich strike recently made on Florida mountain. It continues to improve as progress is made.

STODDARD & ARNOLD have struck the ore chimney on their ledge, the Dubuque, and it seems to be improving with every ft the shaft is sunk.

DURBO the week a strike has been made in the Potosi. The shaft is now 50 ft deep, and has taken out 100 tons of ore, and the ledge is large, as can be seen by the quartz, pieces of which are as heavy as a man can put in the bucket. Negotiations are now pending with Eastern capitalists to take hold of this property, which, if effected, will result in the erection of reduction works at the mine.

MONTANA.

PENOBSCOT AND BELMONT GOLD.—*Helena Independent*, Nov. 11: Capt. Ryan, Superintendent of the Belmont and Penobscot, brought into town, Wednesday, gold of the value of \$18,000, the product of those famous mines; \$12,000 of the amount was from the Penobscot and \$6,000 from the Belmont.

THE GLOSTER MINE.—On Thursday last a run of 130 tons of ore from the Gloster mine was completed, yielding the very satisfactory return of \$1,900. The tunnel is now in 105 ft, and when it reaches 130 ft, will be tapped from the surface. With a 0-ft vein of all paying and easily worked quartz, the future of the Gloster is a very bright one, and its owners are correspondingly elated.

NEW MEXICO.

EMERALD.—*New Mexico Mining World*, Nov. 10: The Emerald, in the New Placers, has a large body of ore in sight. The mine is owned by an Eastern company, for which Mr. Batchelder is the manager. An average assay returned \$80 per ton; \$15,000 has been offered for a two-thirds interest.

CAPT. BRITENSTEIN, of the St. Louis smelting and refining works, recently purchased from Livingston Bros. 3 claims in the Corillos, the Monitor, Sunshine and Wano; price, \$5,500. A contract for sinking a 120-ft shaft has already been let and work commenced.

On Baxter mountain, the same mountain on which the Homestake is located, is the Black Prince. The shaft is 38 ft deep and a north and south drift has been made to the extent of 46 ft. Assays have shown from \$25 to \$207 per ton.

SHORT AND SWEET, Golden Eagle, Platte de Verde and Alice Brinkman are the names of claims in the White Gals, in which 5 Topoka gentlemen are interested. Mr. J. G. Slonecker went down to the camp a few days ago for the purpose of sinking 100 ft on the claim that looked most promising.

ORE from the St. Paul mine, in Grant county, is worked at the Lone Mountain mill of T. Holson. Two men can take out 2 tons a day, and without sorting the mill returns \$20 ounces.

FARNS gold in the Little Mae, at the White Oaks. The best certificate announces 25 1/2 ounces of gold. Three other assays averaged 1 1/2 ounces of gold, and 3/4 ounces of silver.

The Cayote mountains are about 11 miles from the White Oaks camp. The Leadville mine is the best known, which produces ore that makes returns of 40% lead and 15 ounces of silver, and no flux is required.

We are informed that several parties at Lama Pardo, 20 miles north of Las Vegas, have a mining claim distant about 2 miles from that place, upon which a shaft has been sunk about 30 ft, and further work will be done at once.

The new Boston stamp mill, at Silver City, crushes 1 1/2 tons per hour.

The Torrence mine, at Socorro, shows a large body of ore running from 75 to 500 ounces at 100 ft depth. This reopening of old mines with drifts 100 ft in extent is reported from the San Felicitas.

Last month the Mimbre mining company shipped 2 bricks valued at \$5,639.20.

The Little Laddie, in the Mal Pais deposits, owned by N. S. Sunderland, has ore that runs 40 ounces at 7 ft. Mr. Sunderland is of the opinion that these earthenware imprints as they sink to them.

N. S. SUNDERLAND and others, owners of the Acme, Shakespeare, Gtero and Burns claims, located about 5 miles northwest of the White Oaks, have assays showing 36 ounces silver at 6 ft.

MANONEY & ROGERS sold a half interest in their Eureka claims, in Grant county, for \$4,000, showed \$100 apiece of the same lode in their unsinkable shaft, and it out for San Francisco as happy as clams at high tide.

OREGON.

MINING ITEMS.—*Democratic Times*, Nov. 12: The miners are beginning to question the probabilities of a good mining season. Everything is ready at the Sterling and Blue Gravel mines for next season's operations. D. M. Marden, of Kane's creek, is putting in a new flume and making extensive preparations for winter. Capt. Ankeny, of Portland, the enterprising mining capitalist, is now in southern Oregon looking after his mining interests.

Keefer & Co. have completed their wug-dam across Rogue river, near Jos. Douder's, and are engaged in mining the bed of that stream. Ous. Peil, of Gall's creek, reports the miners of that section making considerable preparations for winter. Ralph S. Smith, of San Francisco, special census agent, is now in Jackson county gathering mining statistics for several years past. Work is progressing steadily on Schump & Co.'s ledge in the Willow Springs district. The tunnel will be completed in about a month, and machinery for crushing quartz put in position before long. There is considerable good ore on the dump and much more in sight. The ledge is one of the best in the State.

THE SCHUMPF LEDGE.—*Oregon Sentinel*, Nov. 10: This quartz mine, the property of George Schumpf, which is situated in the Willow Springs district, has recently been visited by a number of gentlemen, among them two California mining experts, who pronounce it among the best, if not the best mining property in southern Oregon. There are about 300 tons of rich quartz rock already in the dumps awaiting the crushing process. The machinery for crushing is now being placed in position near the mouth of the tunnel. The tunnel itself is being dug into the side of the mountain for a distance of 200 or more ft, and is intended to drain the main shaft from which the quartz is taken. Two sets of men, a night shift and a day shift, are constantly working in the tunnel, and Mr. Schumpf expects to reach the bottom of the main or 70-ft

The Early Culture of Cinchona Trees.

As the possibility of introducing cinchona culture in this State is a subject of much interest to those who are studying the adaptation of our conditions for growths which succeed elsewhere, we have thought it timely to give a few points of information from the latest published treatise upon the growth of the cinchona as an industry. This treatise is found in "Spon's Encyclopedia of the Industrial Arts, Manufactures and Commercial Products," a valuable work which is now being issued simultaneously in London and New York, by E. and F. N. Spon, well known publishers of scientific and industrial books. The article on cinchona occupies nine of the large and closely-printed pages of the volume, and seems to us a very complete account of the culture of the tree, the preparation of its products and their commercial importance. As the cinchona in this State is but just entering the experimental state, and as the success or failure in its growth is not yet demonstrated, we have thought it most appropriate to select points relating to early culture, to the end that experimenters who have either the seed or the young plants may be aided thereby.

The trees prefer a rich soil, and thrive better on newly cleared forest land than on grass land; but the crown harks do fairly well in poor ground. While a free and friable surface soil is beneficial, an open subsoil is absolutely necessary. The least saturation of water at the roots is fatal to all species; perfect drainage must, therefore, be secured by a sloping situation, and other conditions.

The seeds germinate best at 65° to 70° F., tolerating a maximum of 80° F., and a minimum of 55° F. During the cold season, they are sown under glass; but during hot weather and rains, in open beds, sheltered by thatched roofs, about 5 ft. above the soil in front, and 2 ft. behind. The best soil is rich, mellow vegetable mold, alone, or mixed with clean, sharp sand. This is sifted, and spread in layers 2 to 3 inches deep and 5 ft. wide, on beds of cleared ground, of any convenient length, running east and west, with the open side toward the north. To prevent water lodging in them, they must slope to one side, a condition best attained by forming terraces on a hillside, and providing a path and a drain to each. Before sowing, the soil is rendered uniformly firm (but not hard) and smooth, by working it through the hand and gently pressing it down. The seeds are then placed loosely in bags, and immersed in cold water, undergoing 12 hours' soaking if fresh, but only 6 if they have been kept for some time. When taken out, they are gently stirred with dry sand, to separate them, and are thickly scattered on the beds, and lightly covered with a sprinkling of dry sand, intended only to steady them and get them into contact with the soil, and not to cover them; the beds may then be very gently pressed with a smooth board. Water is applied in the morning, and, if necessary, during the day, but not at late evening; deluging must be avoided, while a uniform moisture is maintained; the temperature of the water should approach that of the air. Additional shade and shelter have sometimes to be provided. Under glass, extra careful shading is necessary; and, after watering, especial care must be taken that the leaves become quite dry, before closing the frames. Every precaution will have to be taken against damping off; in very wet weather, the plants are sometimes infested by a fungus, whose ravages may be checked by gently stirring the soil. Germination takes place in 2 to 6 weeks.

When the seedlings have 2 to 3 pairs of leaves, they are put out into nursery beds, resembling the seed beds, but having a thicker layer of soil. They are best removed by inserting a small stick beneath them, and loosening the soil, so that they may be lifted out by the leaves, without the least injury to the rootlets. Holes 1½ inches apart, in lines 2 inches apart, deep enough to receive the outstretched roots of the plants, are made by means of a stick; into these, the seedlings are carefully placed, and the earth is filled in and pressed round, so as to thoroughly occupy the hole. Sometimes the seedlings are placed first in shallow boxes, which can be put under glass if necessary. When 4 inches high, the plants are re-transplanted, at distances of about 4 inches each way; and when they have reached 9 to 12 inches, they are placed in their permanent situations. The seedlings may be hardened before the final transplanting by removing the thatch for about a fortnight, commencing only in dull, cloudy weather. From the sowing to the final transplantation, some 8 to 12 months are required, during which the soil must be kept uniformly moist without being wet.

Propagation by Cuttings.—Cuttings planted in the open air and partially shaded will form roots in 3 to 5 months, and this is perhaps the easiest, cheapest and safest plan of propagation, especially for inexperienced cultivators. It is, however, very slow; and when a rapid increase of plants is required, a propagating house must be used. In either case, the cuttings are selected from wood of the current year's growth, preference being given to young shoots springing

from the lower part of the stem; they are removed in pieces about 3 to 5 inches long, just below the point where a pair of leaves grow. Young unexpanded leaves, if any, are left on the cutting; but larger ones are pinched off at the base. The cuttings as prepared are placed in 4-inch pots (Fig. 1); the cuttings, *a*, are set in a layer of pounded brick dust, *b*, under which is the ordinary potting mold, *c*, resting upon a stratum of moss, *d*, and a potsherd, *e*, to facilitate drainage. These pots rest in a bed of damp sand in the propagating house, exposed to a bottom heat of about 75° F. The atmosphere of the house is kept moist by means of a very fine syringe, but the cuttings must never be watered. When the cuttings have become rooted in the propagating cases the pots are hothly removed to other cases, where the plants are hardened off; when sufficiently hardy, they are taken up, and placed singly in pots about 3½ inches deep and 2 inches in diameter, formed of a mixture of cow dung and sand, as shown in Fig. 2. Before use, these pots are dried in the sun, which renders them as strong as an ordinary pot; when buried, they become sufficiently soft to be penetrated by the roots, but remain sufficiently cohesive to bear handling. They are made by hand at the rate of 400 to 500 a day, and cost but 1% of the price of an ordinary flower pot.

When the plants are to be put out in their permanent positions, they are removed hothly in the pots, and transported on wooden trays; holes are prepared for them at distances of 2½ inches apart, and the plants and pots together are placed in the holes, and filled round with earth up to the level of the stem, as shown in Fig. 3. This done, the plants are at once shaded

over them. Sometimes trenching or deep hoeing has been performed previous to planting; but besides being expensive, they are objectionable on steep ground, as favoring wash. Occasionally the size of the holes is increased to 2 ft. each way. The beds of hardened plants ready for putting out are deluged with water over night, so that the soil may be cohesive. On a day when the earth is moist, and the weather cloudy and damp (but not in heavy rain), the plants are taken up with abundance of soil around their roots, and are placed in the filled holes as quickly as possible; a space quite deep enough to receive the largest root without doubling is made by one hand, while the plant is inserted in the ground by the other; the soil is then filled in around, and thoroughly pressed down as the operation proceeds. The position of the plants in relation to the surface of the ground is indicated in Fig. 6; it is essential that they should stand on elevations, drained from above by a ditch, so as to prevent the possibility of earth being washed down and covering the bark—a circumstance that is sure to be attended by fermentation, followed by a fungus that destroys the bark and kills the tree. In the early days, the plants were put out much too wide apart; it is evident that no species will ever attain great size in India, and close planting has the advantage of affording shade to the roots, and reducing the growth of weeds, which are otherwise a source of much expense. Should the trees crowd one another, they can be thinned out, and thus yield an early crop of bark.

Shading and Staking.—In some localities, protection from the sun may be necessary. For this purpose, natural forest trees are quite inadmissible; the requisite shade is readily afforded



PROPAGATION AND CULTURE OF THE CINCHONA ILLUSTRATED.

with rough slabs of wood, arranged as shown in Fig. 4; and when they have grown above the wood, they are protected from chafing by a grass rope twisted round the top.

Layering.—A method by which a far greater number, and more rapid succession of cuttings may be got from a plant is that known as "layering," illustrated in Fig. 5. The operation consists in bending the branches of the plants into the soil, and cutting them half through at the bend. The object of this is to cause roots to spring from the cut portion of the branch, which is placed in the soil for that purpose. The juice of the plant escapes so rapidly from the cut as to induce decay, unless at once absorbed; this end is attained by placing a piece of thoroughly dried brick, *a*, in the slit formed by detaching the tongue, *b*. The latter is then kept down, if necessary, by means of the peg, *c*. When it would be inconvenient to bring the branch down to the soil, the latter may be raised in boxes. The best season for layering is during the rains. When well rooted, say, in 3 to 4 months, the layers are separated from the parent plant, and removed to glazed frames, where they are placed about 6 inches apart in good soil. Here they become established as "stock plants," and yield a constant succession of cuttings. In taking these, whole shoots must not be removed, but a few buds must be left to provide new shoots. Cuttings from stock plants are treated in the same way as any others.

Propagation by Buds.—A method of propagation which gives a large number of plants from a limited supply of wood is occasionally practiced; it consists in removing the buds with leaves attached, and placing them in pots plunged into damp sand, and treating them generally the same as cuttings. Roots are formed in 3 to 6 weeks, success depending entirely upon supplying sufficient moisture, without overdoing it.

Planting.—When a site has been chosen, the natural vegetation is completely removed. In very exposed situations, occasional strips of forest may be left as a break-wind; but they must be sufficiently far from the plants not to invade them by their roots, or by falling

by erecting, on the sunny side of each plant, a rough bamboo framework, thatched with grass or ferns, or by sticking leafy branches in the ground, etc. Where much staking would be required, cinchona cultivation had better not be attempted, because great expense would be entailed, and small success achieved. Some support, however, is occasionally demanded, when the method illustrated in Fig. 7 may be resorted to. The danger to be avoided is the chafing caused by the swaying of the plant; a soft material, such as grass rope, is therefore employed, and care is taken that it shall embrace the branches, without ever coming into contact with the bark of the stem. Staking is commenced when the plants are 1 to 1½ ft. high. A superficial boeing just around each tree is beneficial, whether weeds are present or not; but deep boeing would destroy the roots of the cinchona plants. Pruning must be restricted to the removal of such branches as would naturally fall in course of time, or such as project to the injury of neighboring trees.

SHOW UP YOUR ACCOUNTS.—As the laws of California now stand mining companies must furnish a statement each month of the affairs of the previous month. This provision is pretty well regarded, but occasionally the officers neglect their duty to the stockholders. They are liable to be "hailed over the coals" by any stockholder for this neglect. A case in point occurred this week. Walter I. Pilkington, who says that he is a stockholder of the Silver King mining company, has entered suit in the Superior Court against George L. Woods et al., directors of the company, to recover \$3,000 damages as a penalty for neglect to furnish itemized accounts of the affairs of the company for the month of October last.

AN EXPLORING EXPEDITION.—A late cable dispatch from London says that occasional announcements are made here of the organization of a new British expedition for the exploration of the Island of Borneo. When it is formed it will be known as the Reich Rock Expedition.

Causes of Hard Times in Nevada.

The Virginia City *Enterprise* says: While the entire country lying east of the Rocky mountains is enjoying a degree of prosperity greater than ever before known in the United States, a large portion of the Pacific coast region is suffering from hard times. This is more particularly applicable to the State of Nevada than to any State in the Union. For the reasons for this condition of affairs in this State we need not look far. Our chief industry is mining, and the exhaustion of the great bodies of ore on the Comstock, on which so many people thrived, is the chief factor in the depressed times which now prevail. But this is not all. The burdens imposed on mining are largely responsible. Chief among these are the discount on silver and the tax on the proceeds of mines. The latter it is within the power of the people to so modify that, while the mines shall contribute a fair share of revenue for the support of the State and county Governments, it shall cease to be an onerous burden on mining. For relief from the former, we must trust to time, Congressional legislation and some action by Germany towards remonetization. Senator Jones is the ablest and most ardent advocate of the interests of silver in Congress, and will, no doubt, renew his efforts in behalf of that metal, in which, of course, he will be seconded by Col. Fair, should that gentleman be elected to the Senate, of which there seems to be a strong prospect.

This State has no other industry or resource of any great importance except mining. At this time a great many mines are lying idle, and large chimneys of ore are unworked owing to the drawback we have mentioned. There is in the mines of various districts of the State enough ore to employ a large number of men in its extraction, but the ore cannot be profitably worked while silver is so low in price and the tax on bullion is so onerous. These ores are of low grade and it will not pay to mine them under present conditions. With a small percentage of the cost of production taken off, low-grade ores could be brought to the position of ores now classed as medium grade, and could be reduced at a profit.

The popularity attained by the once despised standard dollar should convince the Eastern statesmen that the American people consider silver a pretty good sort of money, and that their opposition to it was based on false premises. There are no politics in the money question now; it is simply a question of statesmanship. Greenbackism is dead, and a large volume of popular money is absolutely necessary. Gold is not a popular money, because the supply is too small and it is the money of the rich. Silver is the money of the poor and middle classes, and has been such for ages. We hope the Eastern bankers, money kings and financiers can be brought to a realization of the fact that the people demand silver coin, and, more particularly than all, we hope that the President, the Secretary of the Treasury and Congress will act with the popular side and give the country a law which shall result in the enhancement of the value of silver. By a law which will create a demand for silver, the value of silver will necessarily be increased, and if that increase brings the price up to par, the silver dollar is equal to the gold dollar in intrinsic value, and there need be no more talk about an 85-cent dollar.

There is another thing we hope; and that is that the people of the agricultural counties of the State will, by the time the Legislature meets, have become educated up to a knowledge of the fact that the present law for the taxation of the proceeds of mines is crushing the life out of the mining industry. The agricultural interests of the State are largely dependent on the mining industry, which enables them to market their products profitably. In insisting on the maintenance of a law that hampers the industry which creates their best market, the farmers and stock men of Nevada will be killing the goose that lays them the golden egg.

It has often been the subject of remark that the Southern States should be so conspicuously lacking in enterprise, as shown in their abstention from the manufacture of their great staple. Lately, however, a change has passed over the spirit of their dream. They have begun to manufacture cotton in earnest. The spindle are 7% of the total number employed in the country, and aggregate (including 113,000 in Maryland) 774,000. These Southern cotton mills are small, but more profitable, in proportion, than the more extensive establishments in the North. The saving in cost of raw material in the South is at least 20%—an important factor when it is considered that the raw material amounts to 64% of the total cost of the manufacture.

A DELICATE CALIPER.—The pachymeter, lately patented in Vienna, which determines the thickness of paper to the one-thousandth part of an inch, is outdone by the micrometer caliper, now coming into use in this country, which determines the thickness of paper or anything else, to the ten-thousandth part of an inch.

THE ENGINEER.

Railroads for Mexico.

The telegraphic reports of the past week refer to an important meeting of railroad magnates which was held in New York on the 11th inst., at which Mr. Romero, formerly Mexican Minister, was present, and urged in an elaborate speech that American capitalists should come to the assistance of Mexico in developing her means of interior communication. General Grant, who was also present, was called upon by Mr. Romero to express his views. He made a lengthy speech, urging the cultivation of friendly and commercial relations with Mexico, and saying that with building railroads and telegraphs there need be no more apprehension for the safety of capital invested there than in our own country.

After the meeting, Gould proposed the formation on the spot of a special committee to take into consideration the whole subject of railway communication with Mexico. This proposition was adopted, and the following gentlemen were informally named as members of the Committee: Chairman, Gen. Grant; Romero, representing Mexico; C. P. Huntington, representing the Southern Pacific railroad; Gen. G. M. Dodge, representing the Texas Pacific railroad; Jay Gould, representing the Missouri, Kansas and Texas railroad; C. T. Woerischoffer and Gen. Wm. J. Palmer, representing the Palmer and Sullivan grant; Edward D. Adams, representing the Mexican Central grant and the Sharon grant; Thomas Nickerson, representing the Mexican Central grant; T. Jefferson Coolidge, representing the Atchison, Topeka and Santa Fe railroad, and J. H. Work.

The following gentlemen were present and took part in the proceedings: Gen. Grant, Mr. Gould, Gen. Palmer, Mr. Coolidge of Boston, Mr. Huntington, Samuel Sloan, Mr. Woerischoffer, Russell Sage and Mr. Romero. It would appear from this action that the leading railroad men of this country are really looking to our sister republic as a source for the future feeding of some of the great railroad lines of the country. Such commercial connections, based upon proper diplomatic assurances of protection to investors, would do more to build up Mexico and enrich our own country than any other enterprise which is now open to our capitalists. It is to be hoped that the countrymen of Mr. Romero will catch some of his own enthusiasm and confidence in the enterprise which he is fostering.

THE CANADA TRANS-CONTINENTAL RAILROAD. The Toronto Evening Telegram of Nov. 11th, has a lengthy editorial on the Canada Pacific railway terms, supposed to come from the highest authority. It says: "The Government gives a syndicate, \$25,000,000 in cash and 25,000,000 acres of land, to finish portions of the road at present being constructed, and hands them over, with the portions already constructed, to the company, when the whole line is finished. The value of the portions of the line constructed and handed over by the Government is roughly estimated at \$30,000,000. The company gives \$1,000,000 and a certain portion of land as security for the working of the line. When the line has been worked for a period deemed sufficient to insure its continuance, the security, lands and money, will be returned to the company with interest. Estimating the land at \$2 per acre, the gross subsidy, with the completed sections, represents the sum of \$105,000,000. The Government pays the syndicate for the construction of the road." If the above statement is correct, there need be neither difficulty or delay in the construction of this proposed northern highway across the North American continent.

THE LONGEST TUNNEL IN THE WORLD.—The Joseph II. mining adit, at Schemnitz, Hungary, begun in 1872 and finished last October, is now the longest tunnel in the world. Its length is 16,538 meters, that of the St. Gotthard tunnel being 14,620, and the Mont Cenis tunnel 12,233 meters. The object of the adit is the drainage of the important gold and silver mines at Schemnitz. It furnishes a geological section more than 10 miles in length, and gives not only valuable information as to the downward prolongation of the lodes known in the upper levels, but some new ones have been traversed, and the entire series of rocks, with their mutual limits as well as modifications and occasional transitions, are disclosed without interruption. The entire cost of the tunnel was 4,566,000 florins—about \$2,300,000. Its height is three meters; width 1.6 meter.

VALUE OF GOOD ENGINEERING KNOWLEDGE. Col. Waring has been in Pittsfield, Mass., to make plans for sewers in streets not already provided. The commissioners intended to put down an eight-inch pipe, but Col. Waring thinks a six-inch sewer is large enough, and that six ft. under ground is better than eight or ten. One sewer, estimated to cost \$15,000, he thinks can be laid for \$4,000, and under his plan the sewers in the district, which have already cost \$48,000, could be built for \$20,000.

The deepest perpendicular shaft in existence is the Adelbert shaft in a silver-lead mine in Příbram, Bohemia, which is 3,280 ft. deep. Twenty years ago a mine in Hanover reached a depth of 2,900 ft., while there are numerous

USEFUL INFORMATION.

A PAPER HOUSE AND PAPER FURNITURE.—The multiplying applications of paper are strikingly illustrated by the fact that in the recent Sydney exhibition there was shown a house, built and furnished throughout with articles made of paper. The structure was one story high, with the skeleton or frame-work made of wood. The exterior was covered with panels made of paper pulp, while the interior was covered with the same material—plain on the floor, but forming splendid arabesques on the walls, and molded in imitation of plaster on the ceilings. The doors, cupboards and shelves were of the same material, while the entire furniture, including chandeliers and a stove in which a fire could be lighted, was made of papier-mache. The carpets and curtains were of paper, and there was a bed-room, in which there was not only a large bedstead made of papier-mache, but blankets, sheets, quilts, and female under-clothing, dresses and bonnets in the latest style, composed solely of carton-pate. A series of benches were given in this building, in which plates, dishes, knives, forks and glasses were all of paper.

THE POPULATION OF THE WORLD.—Dr. Behm and Prof. Wagner, German geographers of standing, who have devoted much attention to the statistics of population, have just issued a new edition of their calculations. They arrive, after great labor, at results which we quote, because they modify materially the estimate popularly current in Great Britain:

Europe.....	315,920,000
Asia.....	888,704,000
Africa.....	205,670,000
America.....	95,405,600
Australia and Polynesia.....	4,031,000
Polar regions.....	82,000

The world.....1,450,920,600
The calculation for Europe, which must be substantially accurate, is much larger than the usual one, but even then the immense bulk of humanity, 10 in 14 of mankind, dwells in Asia and Africa, a fact which the philosophers will do well to remember. The Londoner or Parisian is not exactly "Man."

TO MAKE VINEGAR.—Among the many recipes for making good vinegar we give the following: 1. Boil either corn, wheat, barley or rye, about one pint of the grain to a gallon of water, strain, and to the liquor thus obtained add syrup or sugar until pleasantly sweet. Let stand in a warm place, and you will soon have good vinegar. The stronger and sweeter the liquor the stronger will be the vinegar and the longer in making. 2. Pack in a jar the skins and cores of apples made in preparing pies and sauce, and cover with boiling water. When another lot is made, add them and more hot water till the jar is full. In warm weather set the jar in the sun, carefully covered with a cloth; in cool weather in a warm place in the house. The apple do not rot at all. In six or eight weeks the water is turned into excellent vinegar and of an amber color. No yeast, nor spirits, nor acids, nor sugar, nor molasses are needed—nothing whatever but the skins, and cores, and water.

WASHING COMMON WORKING PANTS.—The Scientific American gives the following as the best method for washing a pair of common working pants, that is tolerably greasy, so as not to discharge the color. It is impossible to wholly prevent the washing out of the dyes; still, if treated in the following manner, and not allowed to remain too long in the water, the effect of the washing on the dyes will be less apparent: Water 1 gallon, soap $\frac{1}{2}$ lb.; boil to dissolve; add 2 oz. borax; dilute with about 8 gallons of water; work the goods through as quickly as possible, and rinse without wringing. An aqueous solution of 1 part copperas and 7 parts logwood extract, may be used for reviving the faded color of cheap black goods.

COFFEE FUMES A POWERFUL DISINFECTANT.—The power of burnt coffee as a disinfectant has been tested by some recent experiments made in Paris. A quantity of meat was hung up in a closed room until decomposed, and then a chafing dish was introduced and 500 grammes of coffee thrown on the fire; in a few minutes the room was completely disinfected. In another room sulphureted hydrogen and ammonia were developed, and 90 grammes of coffee destroyed the smell in about half a minute. It is also stated that the fumes of coffee quickly destroy the smell of musk, asafoetida and other powerful odors.

COLORS FOR SHOP WINDOWS.—A very beautiful amethystine color can be produced by dissolving 5 grains of salicylic acid in a little solution of ammonia, mixing this with 2 gallons of water or enough to fill the show bottle. To this is added a few drops of solution of chloride of iron, and afterwards a few drops of muriatic acid.

DEODORIZING INDIA-RUBBER.—Place the articles in powdered charcoal, contained within a vessel, which must then be closed and submitted to a temperature of 94° F. for several hours.

TO CLEAN BATTERY ZINC.—To clean off the hard scale that has collected on the zinc of a battery, take sulphuric acid diluted with two or three parts of water, and use a stiff wire brush.

A COLD PROCESS FOR MAKING COFFEE.—It is said that the full aroma of coffee can be extracted without any application of fire, as follows: Take five ounces of best coffee; roast and grind to a coarse powder; pour the grounds into a glass bottle, or decanter; pour on a sufficient quantity of cold water to cover the coffee; stop the bottle, or decanter close; set in a warm place for 30 hours; now filter the infusion by passing it through some fine lawn, or blotting paper placed on a glassfunnel, or by straining through muslin. The experiment, it is asserted, "will delight as well as surprise all ladies of intelligence and taste."

FINELY POWDERED METALLIC OXIDES for experimental or other purposes, may be obtained by igniting the resins of the respective metals. For instance, to prepare oxide of iron, melt some resin, and mix it with as concentrated a solution of iron and nitric acid as the resin will take up. Ignite the resulting resinous mass, in an iron plate, until the resin is entirely burned away; the spongy residue may then be rubbed to a powder, and the color may be altered by further heating.

PURIFYING SPIRITS.—Berliet has discovered the fact that raw spirit can be purified by treatment with a solution of nitrate of silver and subsequent rectification. From two to two and one-half parts of dry nitrate of silver are sufficient for 1,000,000 parts of crude spirits, a 10% water solution being employed. The odor is entirely removed from the worst quality of crude spirits by this infinitesimal amount of silver.

LIQUID GLUE.—One hundred parts of ordinary gelatine are dissolved in 400 parts of water containing from six to seven parts of oxalic acid. The solution is kept for five or six hours on the water-bath, in a porcelain infusion pot, after which it is neutralized with carbonate of lime, the insoluble precipitate filtered off, and the clear filtrate evaporated at a moderate temperature, until about 200 parts are obtained. The product is a durable, slightly-tinted, but clear, liquid glue.

AN EMERALD GREEN OF GREAT BEAUTY, can readily be produced by dissolving a five-cent nickel piece in equal parts of nitric acid and water, then diluting with sufficient water.

BRASS COATING FOR STEEL.—For small articles, clean and plunge them in a mixture of six grammes each, of sulphate of copper and chloride of tin in a quart of water.

TO WHITEN SILVER.—Boil in a solution of 1 part cream of tartar, 2 parts common salt, and 50 parts of water.

GOOD HEALTH.

Disease from Drinking Water.

EDITORS PRESS:—In the PRESS of Oct. 30th a correspondent from Bakersfield refers to a previous article (Sept. 4th), in which some one who evidently knew little of what he wrote about, deniee that foul and stagnant water can cause disease if taken into the stomach, contending that the lungs alone take up the infection. The article was absurd enough in itself to warn your readers of its fallacies, but other popular articles show that the bow and the why of infection from drinking water is not yet so plain as it might be. He says: "Doctors frequently examine water with a microscope and see small animals in it," which they report as producing sickness. Now, these small animals differ in their nature as much as do larger ones. Thus we have snakes which are poisonous, and snakes which are harmless (and, as some bold, even useful in eating up insects which destroy our food plants). So while it is best to drink water as free as possible from all minute life, yet some few of these microscopic animals cannot live in foul water, and their presence in a water is almost a proof that it is safe for drinking purposes. But this subject is as yet in its A B C, and until it is more fully studied I would prefer to do as your correspondent does, and boil all water before drinking it.

That water, or even infected milk, may carry the seeds of disease into the body is too common and too well proved to be unsettled by anybody's belief to the contrary. Doubtless people may and do drink dirty water with seeming impunity for years, but nothing is now more certainly proved by the death returns of our towns than that cholera or other infectious disease has not half the power to kill after a pure water supply has been made compulsory on the inhabitants. More especially has this been seen in England, where the government has locked up old popular pumps and wells, long famous for their bright, pure-looking water, and compelled the introduction of a pure water from a distance. Not only have such measures reduced the mortality in a cholera epidemic from many thousands to a few tens, but the ordinary fall bowel complaint that carried off so many children has in many large cities fallen

off one-half. Army surgeons, again, are not too familiar with the dangers of bad water. In our own great war more men died from disease than from fighting.

The common impurities of dirty water weaken the health rather than produce positive disease, but the greatest dangers of such waters are their readiness to receive and multiply infection. Sow some corn on a dry sand and it will never sprout, grow nor multiply its kind, but sow it in a well-mannered, moist earth, and it rapidly and abundantly multiplies itself. So with disease. Probably all diseases—hnt certainly all of the infectious kinds—have their seeds. Sow them sparingly in pure water, or on a healthy body, and their infective power is slight, but in dirty water or on a weakened body their multiplication is sure. Instances are innumerable in medical literature of the introduction of a single case of typhoid fever into a town supplied by surface wells being speedily followed by quite an epidemic, due to fever-seeds getting into wells by soakage from the cesspools. The same fever has facts in its history that completely demolishes the idea that infection is received only by the lungs. In most large hospitals this fever is treated in the common sick wards, so little does its infection spread by air. Thousands upon thousands of cases yearly lie in beds but a few feet removed from other beds where rheumatism, dropsy and other common diseases are treated, and yet no case of this fever has ever occurred from such air infection. But let one drop of the excreta of a typhoid-fever patient fall into the milk or other fluid food and infection is almost certain to the person who allowes it. Pure water is not so certain to carry it, but has done it, probably from receiving a large quantity of the poison. Surface water resembles a fluid food more, as it contains nourishment for the germination of the fever-seeds.

Whilst, however, dirty water weakens our resisting power to disease it is as foolish to look for fever from it, if it contain no fever-seeds, as to expect corn to grow from a hushel of mixed seed into which no corn had been put. But one common cause of diseases seems to follow very much on the use of well water exposed to the drainage of cesspools or surface filth, and that is sore throat. If sore throats are common in your home look to your water supply or to your drains. The water might be good and yet receive infection in the house from drain-air through untrapped or leaky pipes.

A rough test for the purity of a water which may appear clear to the eye and pleasant to the taste, is to half fill a well cleaned bottle with it, cork it loosely and keep it in a warm place (about 80°) for a few days, shaking it occasionally. If immediately after shaking it be uncorked and held to the nose, and no bad smell be detected within a week the water is probably safe. But boiling a water for a quarter of an hour, and then allowing it to cool in clean and well-covered vessels, is the safest plan with all drinking waters, for filtration it must be remembered cannot purify disease-infected water. SANITARIAN, M. D.

The Use of Grapes.

With the abundance of grapes grown in California, but little attention has been paid to the value of the fruit as an article of diet, both in health and sickness. They contain a considerable amount of hydro-carbonaceous matter, together with potassium salts, a combination which does not tend to irritate, but, on the contrary, to soothe the stomach, and which is consequently used with advantage even in dyspepsia.

According to Dr. Hartsen, of Canbes, in France, who has recently contributed an article on the subject to a foreign medical journal, the organic acids in grapes, especially tartaric acid, deserves more consideration than they have generally received. Their nutritive value has, he thinks, been much underrated. It is known that they are changed to carbonic acid in the blood, and possibly careful researches may show that they are convertible into fats. Dr. Hartsen thinks that they should be ranked with the carbohydrates as food. They have been found a valuable diet in fever, and the success of the "grape cure" in the Tyrol and other parts of Europe appears to show that they are positively beneficial in other diseases.

TO RENDER COD-LIVER OIL TASTELESS.—Dr. Peuteves, in a French journal, recommends in order to render cod-liver oil tasteless to mix a tablespoonful of it intimately with the yolk of an egg, add a few drops of essence of peppermint and half a tumbler of essaged water. By this means the taste and characteristic odor of the oil are entirely covered, and the patients take it without the slightest repugnance. Besides, the oil, being thus rendered miscible as the water in all its proportions, is in complete a state of emulsion as the fats at the moment they penetrate the chyle vessels, consequently absorption is better assured.

FRECKLES.—These troublesome patches indicate a disturbance in the function of the skin. The capillaries are congested with effete or excrementitious matter, hence the yellowish discolorations. Persons who are troubled with this, are in the habit of eating food which contains too much carbon. They are fond of butter, sugar, gravies, salt, rich sauces, etc. The character freckles represent is that of carelessness in diet, perhaps in washing, too, rather than anything of a special moral type.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, Nov. 20, 1880.

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The Week.

The mining news of the week shows great activity in different quarters. This is specially noticeable in Utah, Idaho, Arizona, Montana and New Mexico. In Utah the mines are producing bullion in large quantities. In Idaho numbers of new mines are being opened and made producers. Montana mining affairs are quite flourishing. Arizona and New Mexico are both getting a good many new citizens, a large proportion of which go there to mine. The new camps offer better inducements than old ones, and where work is slack miners are moving on to new fields. In this connection the following item from the Virginia Enterprise is significant. It says: "There are too many people on the Comstock. The single men should branch out, as the labor field is fully occupied by men with families, and many of them are out of employment. The completion of the Southern Pacific railroad is destined to open up a big mining, agricultural and stock-grazing country in New Mexico and Arizona, which Territories offer a wider field for energetic men than Nevada now does or is likely to do for some time to come."

California has been blessed with no rain as yet, although it may be expected every day. The severe, dry northers which have prevailed of late have been very disagreeable, but as no young grass has been started, they have done no special damage.

A careful perusal of our summary of current mining news, to be found in other columns, will repay any one who is interested in mining matters. This condensation of the news of the day will show to what an extent the mining industry is carried on, and over what an extensive field it is spread. Those who are thinking of going to the mines can see which sections are the most promising, and in which sections the

New Processes.

The hydro-chlorine system of ore reduction is the latest thing in processes. It is a new system by which silver, gold or lead ores are reduced at a cost not to exceed \$6 per ton; the complete plant for a smelter of five tons daily capacity, including license, costs \$5,000. The advertisement in the New York papers announces that the process consumes but a small supply of fuel, either wood, coal or charcoal. The hydro-chlorine system is a radically new one. The company say that "by this novel system the full assay value is obtained, and, with some classes of ore, 10% to 20% more, it being a well-established fact that quite a percentage of the precious metals volatilizes under the ordinary fire assay."

This heats most of the new processes. Very few of them claim to get out over 93% or 99% of assay value, but this one proposes to secure from 10% to 20% more.

It seems to us that people with new processes, especially those involving chemical principles, as nearly all do, make a great mistake when they suppose the mining community to be entirely ignorant on such subjects. One man tells us that by adding a certain substance to a natural mineral water he can produce gold. Another, as in this instance, tells us that he can, by a smelting process, or one requiring a furnace heat in some way, obtain more from the ore than a fire assay will show to be present, "because a percentage of the precious metals volatilizes under the ordinary fire assay." Which leads us to infer that there will be no volatilization in his furnace.

Such assertions are idle. They make any metallurgist smile quietly, and any miner get his hack up, and think "those fellows are giving us taffy." And it is pure "taffy." They don't go to work and give the public a description of their process which will be intelligible, and from which the public may draw its own conclusions. The conclusions only, manufactured to order, are given publicly, and miners are supposed to swallow the statement, however absurd.

It was not many months since, a process was originated in this city for working ores. In that case we were told the ore yielded, by "vapor assay," certain numbers of dollars and cents, which ordinary fire assay failed to show. We were then told that fire assays were frauds, and did not show what was in the ore. That process and those "mines" are things of the past, but the fire assays are still believed in. Now again comes a process which will heat fire assays, and when we see the assertion backed by the evidence of some competent and disinterested metallurgist, we may take it into consideration for investigation. But we won't believe it then. Mining men know something about such matters, and are not so easily caught with chaff. When they hear of a process to get 99% out of the ore, they don't believe it; and when they hear of one that is going to get more than the assay shows, they either think the projectors are fools, or that the projectors think they are.

THE ARTHROZOIC CLUB.—The Arthrozoic Club of this city held its regular meeting on Wednesday evening in the rooms of the Viticultural Society. After the regular business had been transacted, the members were entertained by remarks from Drs. Kellogg and Bleasdale. Speaking of his trip to Owens valley, Dr. Kellogg wished to draw attention to two things which he witnessed there and thought they might be turned to practical account by agriculturists. The first related to the mode employed by the Indians of taking worms from the *Pinus ponderosa*, which they collect and prepare for food. They first carefully scoop out a little trench around the root of the tree—say six inches deep—then by burning under the trees such stuff as will make a thick smoke, when the worms make ways and come to the ground in search of pure air. The hanks of the ditch being composed of loose sand, the worms cannot climb it, and, therefore, are unable to reach the tree again. By this means the Indian serves a double purpose—provides himself with food and preserves the seed of the tree. The second related to a natural process of dwarfing trees. The *Pinus Jeffreyi*, whose tops often attain an altitude of 150 to 200 ft., was growing luxuriantly, when suddenly he came upon a grove—within 150 ft. of the giants—from whose tops a man could easily pick the cones. They had arrived at perfection, and the doctor was rather happy in the thought that he had discovered a new pine. On inspection it proved to be no other than the *Pinus Jeffreyi*, and the cause of its diminished stature was found to be a mineral spring in the immediate vicinity, which had saturated the ground on which the seed fell and had thus shorn the tree of its great proportions.

At a meeting of the Executive Committee of the World's Fair Commission, held this week, a report was read approving of Central park as the site of the fair, and calling upon the city and State authorities to grant the use of it. This decision will evoke great popular opposition, there being an inflexible feeling on the part of many that Central park must not be

Military Engineering.

We notice in the annual report of Gen. Sherman, a suggestion that "artillery officers should also be associated with the engineers in constructing, altering and repairing the sea coast defenses, because the men who have to fight these batteries should have something to do on their construction." This suggestion will be hailed with pleasure by the artillery officers, but will be entirely ignored by the engineers. The engineer corps is the most conservative branch of the public service. Its members are supposed to be selected from the cream of the graduates of West Point. They are, to a certain extent, more independent than any other branch of the service. The engineer officers are not apt to be moved about from post to post. They are never hurried in their work, and they have pretty easy times as a general thing. But they do not like to be interfered with. The artillery officers have frequently hinted a desire to have something to say about fortifications, but as they are systematically ignored, they always growl about the works. No artillery officer will ever acknowledge that fortifications are constructed as they should be; and no engineer is likely to concede that the artillery man knows anything about anything except guns.

When we come to think of it, however, we are reminded that most of our fortifications are useless for the purposes for which they were intended, by reason of the rapid improvement in the means of offense, during the past 10 years or so. Fort Point, at the entrance of the harbor, would amount to nothing in preventing the entrance of an iron-clad. Very extensive changes have been and are being made at Alcatraz, to fit it up as it should be. In truth, our Government works are so slowly accomplished, that half the time the work will be out of date by the time it is finished. This is due to the irregularity of appropriations rather than to any fault of the engineers, who cannot work without material. Gen. Sherman does not think much of our sea coast defenses, nor does he think them very necessary. He says: "For similar reasons, and because the commerce of the world is carried on in ships of 3,000 tons and over, and because of the heavy draft of war vessels, most of our sea coast defenses are superfluous. We now have 50,000,000 people, and the idea of any hostile force landing on our coast is preposterous. Yet our great commercial ports should be made so safe, that even an apprehension of danger would not be felt. Portland, Boston, Newport, New York, Philadelphia, Hampton Roads, Port Royal, Key West, Pensacola, New Orleans, San Diego, San Francisco and Port Townsend, should all be properly fortified and garrisoned. All the minor forts should be sold or abandoned. An annual appropriation of \$1,000,000 would in a few years put these forts in good order, and another million a year would properly arm them; and the Secretary of War and the President should have discretion in the disbursement of this money."

This last suggestion is a good one. The Secretary of War is more apt to know where money is needed than Congress is. If the money is appropriated for fortifications it ought to be put where it would do some good, and not be frittered away one place and another so as to accomplish little.

CALIFORNIA OAKS.—At the last meeting of the California Academy of Sciences, Dr. Engelmann, who is here investigating the forest trees of this coast for the U. S. Census, was asked for some information concerning our native oaks. Dr. Engelmann said that in the East he had been studying the oaks for a very long time. He thought he knew all about them, but when he came here this opinion was shaken. In looking at the specimens in a laboratory we think we can identify them. When, however, we go to the mountains and see the great variety of forms, we become confused. With the greater number of species he has little trouble, but with some, identification is very difficult. The most eminent authority on oaks has declared that the white oaks of California might possibly be a form of the common European oaks. Dr. Engelmann thinks that they are very distinct from the European or Eastern. A number of species are very distinct here. Dr. Engelmann suggests that botanists here should study the forms indigenous to their neighborhoods. In this way certain points will be cleared up better than they can be by any chance traveler. The local botanist may watch the tree at different seasons and note the changes. He will thus be enabled to clear up some confusion that now exists owing to the variety of forms.

A LEADVILLE special says: Owing to the fact that the fire in the underground working of the mines on Frier Hill, which started in the Chrysolite nearly two months ago, still burns, the Little Chief and other mines were ordered by the Court to suspend work temporarily. On Thursday night the Little Chief resumed operations, disregarding the injunction or the order to close its level against the approach of the fire. Eight hundred lbs. of giant powder were exploded this afternoon on the line between the Little Chief and Chrysolite, to break down the stopes. Another charge of 1,000 lbs. will be fired to-night. Six men

Capt. Eads on Debris.

Capt. J. B. Eads, Consulting Engineer of the State, has filed a report with the Governor. He recently visited the State, examined the Sacramento river and its tributaries with the view of determining the best methods to pursue to improve their navigation, and to protect the valleys from the further encroachment of debris from the mines. The report is very elaborate, and no condensation can do it the justice to which it is entitled. It is, in itself, the essence of conciseness, and would be marred by any effort to present it at less than a whole; but a sort of index to it may be given to outline its character. He begins by stating all his means of information relative to the valley rivers. He shows then the vast quantities of debris washed into rivers; that the catchment area of the rivers exceeds the valley area; that the flow of detritus has been vaster far than the most extravagant have given credit for, and points out how it has buried whole sections, and will continue to do so. He then considers whether Nature, by her process, would have done this, and explodes the idea that she would. He shows how the valley lands, being flat and absorbing rainfall, do not send soil in any material quantity to the rivers. He then considers how the filling up of the rivers is going on, how bars become islands, and the rivers are raised till they run on ridges. He next points out the only remedies known, to wit, to treat the rivers so as to enable them to carry off the sediment.

This is to be done by checking detritus descent by brush dams. This partially clears the water and gives it power to take up and carry off sediment below by leveling up the rivers. Next, this will increase their slope, augment the force of the current and give a scouring power. Lastly, they must be straightened in places in order to increase the slope or fall, and hence the rapidity of currents. He favors closing up the old river at Grand Island, dredging out Steamboat slough and forcing the river through there. He shows that the rivers have power to carry their flood waters when thus treated. He explodes the idea that increasing the outlet of the stream lessens the danger of the overflow. On the contrary, it injures the stream and takes away the force of the current and carrying capacity. He plainly intimates what must come if remedies are not applied, and leaves the conclusion fixed on the mind that one of the fairest sections of the State, one of the greatest valleys, will be rendered valueless to man unless its streams are properly and uniformly treated. Regarding Suisun and San Francisco bays, this extract from his report may be given in full: "As large areas of shoals which are now more or less exposed at low water, must, as a result of the correction of the river, necessarily be built up to very nearly the height of the natural banks by the deposits which will be removed from the shallow channels, and as many deep pools existing below the sand bars in the narrow parts of the river will be filled with the bar material removed, there is no occasion to fear that the rectification of the river will materially increase the amount of deposit accruing in the bays in the lower part of the river."

"In the slow process of nature, controlled by art, Suisun bay would gradually be reduced to the width of the river proper, and the bay of San Francisco would in time undergo a similar change. But it should be remembered that it is the maximum tides and floods which determine the magnitude of sedimentary channels. Hence the rapid drainage of the valley. Increasing the force of the floods will promote the discharge of the sediment into the ocean, for it will aid the tidal action in keeping it suspended until the greater part of it is finally discharged there. The sediment left in the water after the construction of the proposed works for arresting the mining detritus will settle much more slowly than that which now flows down, and must make the injury to the bays a very slow and remote occurrence."

"With respect to the influence of the tides upon the lower portion of the river, it is only necessary to say that the same laws we have been discussing apply with equal force to the motion of tidal waters in river channels. The inward and outward flow of the tides will create and maintain a channel in proportion to the maximum volume and slope of the ebb tide passing through the channel. Hence, where a tidal basis of great extent occurs, as at Port Royal, New York and San Francisco, the channel through which it is filled and emptied will be proportionately large, and as the depth and width of the river channel increases, the tidal water will enter with less frictional resistance, and the volume of the ebb will be proportionately greater. Therefore, as the improvement of the lower part of the river channel progresses, the force of the tidal action will increase and aid in maintaining such capacity as the combined influence of the river floods and tidal action, under a better system of drainage, will create."

FROM Eureka is announced the death of William H. Clark one of the oldest citizens of Nevada. In the early days of Nevada Mr. Clark was a merchant and wood contractor at Dayton. When the White Pine excitement broke out he went to that district and entered into business there, but when White Pine began to decline he moved to Eureka, then just looming into prominence, and there laid the foundation of a large business.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last, Dr. Behr in the chair. Donations were reported from W. G. M. Harford, C. H. Gilhert, R. W. Simpson and Drs. Englemann and Parry. Also, from Mrs. Dr. M. K. Curran, east and west-country rock of Hale & Norcross mine, Comstock lode, and specimens of silver ore from Hale & Norcross, Sierra Nevada, Gould & Curry, Overman, Union, Savage and North Bonanza mines. From C. D. Gibbes, volcanic rock and lava, and coral showing perforations made by shell-fish. Mrs. M. K. Curran presented quite a large collection of ores, minerals and rocks. Mr. Redding called special attention to this latter donation, and said that it was valuable from the fact that not only were the ores presented, but the country rock in which they occurred. This was always important, but generally overlooked. Miners when they saw specimens of ore from a certain locality always wanted to see the rock in which it occurred. The sample specimens of ore alone were of very little value without samples of the country rock. W. H. Dall, of the U. S. Coast Survey, who was present was asked to give an account of his trip to Alaska this summer. He complied with the request, and we have given his remarks in another column. Speaking of fishes, however, he said that in a general way the fishes were similar on the Asiatic and American sides; but there were some species only found on one shore.

They found quite a number of California fish that attained a high latitude, several found commonly in the market here, especially red cod, which was found a considerable distance north of Sitka, in large quantities and of a very good quality. They secured salmon, not only for specimens, but they formed a large part of their food during the season. There are a great variety of salmon recognized among here on the coast of Alaska, and the question arises in Oregon and California how many of these are distinct species and how many are to be referred to the very extraordinary changes which take place in the salmon from the time of leaving the sea till death, and to the local peculiarities.

Very few of them ever return to the sea, differing in that respect from the European salmon. In California and Alaska he believed that most of the salmon die after depositing their spawn. They found the Columbia river salmon extending through a large part of Alaska, when they came across a peculiar fish called the "king" salmon, which attains an enormous size, reaching 100 lbs. Then there are quite a number of trout, and near Sitka a very large trout is caught, the size of the salmon.

Mr. B. B. Redding, one of the California Fish Commissioners, called attention to a popular fallacy concerning the universal death of salmon after spawning. He said that although 78% or 80% might die, they did not all do so by any means. This had been proven by Mr. R. D. Hume at his cannery at Rogue river. One season he had caught 50 male and 50 female salmon, removed the spawn and milt, notched the dorsal fins, and returned them to the water. The fishermen were instructed to look out for these marked fish, and next year 10 of them were caught. The following year several more were caught, and the year after five more found their way into the nets.

Some people suppose that because large quantities of dead fish are found on the banks of the McCloud river, that the salmon all die and never return to the ocean. The salmon, returning to the sea, float down the river, with their heads up stream, the current taking them down.

The U. S. Fish Commission had been taking California salmon eggs to the Eastern rivers for some 10 years, but not a California salmon had ever returned to one of these rivers, and none had ever been caught. When put in lakes or ponds they had matured, but were always of small size. No reason could be given why they did not return to the rivers from the sea. Prof. Baird was going to try it one year more, and if no better success followed, the project would be abandoned. By some it was supposed that because all our rivers flowed west, and the fish in returning to the rivers swim east, when they want to return they always swim east, and this

on the Atlantic coast takes them off the coast. Dr. Dall explained that on the Yukon river salmon are caught in "pots." The Indians construct barriers across the stream. On these are constructed, with strips of spruce, these compartments or traps, which are about as big around as a waste-paper basket. A flag is attached to a pole, and when a fish gets into the apartment, the flag is shaken, and the Indian paddles out his canoe and secures the fish. The fish are so thick at times that they can be kicked out of the small streams. In their journeys they injure their fins and scales on the stones, and then the fish fungus attaches itself, and the fish presents a most unpleasant appearance, turning all sorts of colors. They are all caught, when young, up the stream. He only knew of one instance when the fish were caught coming down.

The California Planer and Matcher.

We illustrate this week a machine which is very popular among the interior planing mills of the Pacific coast. It is a planer and matcher which has been built to meet the peculiar wants of mills on this coast.

It was first introduced to the mills of this coast by Berry & Place, of this city, some 10 years ago, since which date it has been improved from time to time, and changes made in accordance with suggestions of many mill-men who have used the machine.

Among its many advantages may be mentioned its four-slotted steel cylinder-head, its

A Season's Work in Alaska.

Dr. W. H. Dall, of the U. S. Coast Survey, well known for his scientific work in Alaska, passed this season, as usual, in the surveying schooner, *Yukon*, along the Alaskan coast. Since the party left San Francisco, they have sailed over 12 000 miles. At the last meeting of the California Academy of Sciences, Dr. Dall was asked to give a brief account of his summer's cruise. He stated that Dr. Bean had accompanied him this year for the purpose of devoting his entire time to making natural history collections, especially of fishes, in connection with the work of Prof. Jordan and Mr. Gilhert on the California and Oregon coast. He had found the common California brook trout on the Asiatic side of the Behring's straits, and had caught them in seines in salt water. They paid particular attention to the codfish and the haddock, and Dr. Bean became very confident that the Pacific codfish is the same as those caught in the Atlantic; and there is no reason why, in the course of time, with some care and attention, the Pacific codfish should not become as valuable and important upon this side of the continent as the Newfoundland fishes are upon the Atlantic.

They found some very interesting specimens, and some thought to belong to a new family. While there they learned that an individual had captured the original sea serpent. He gave a description of it, saying that it was 15 fathoms

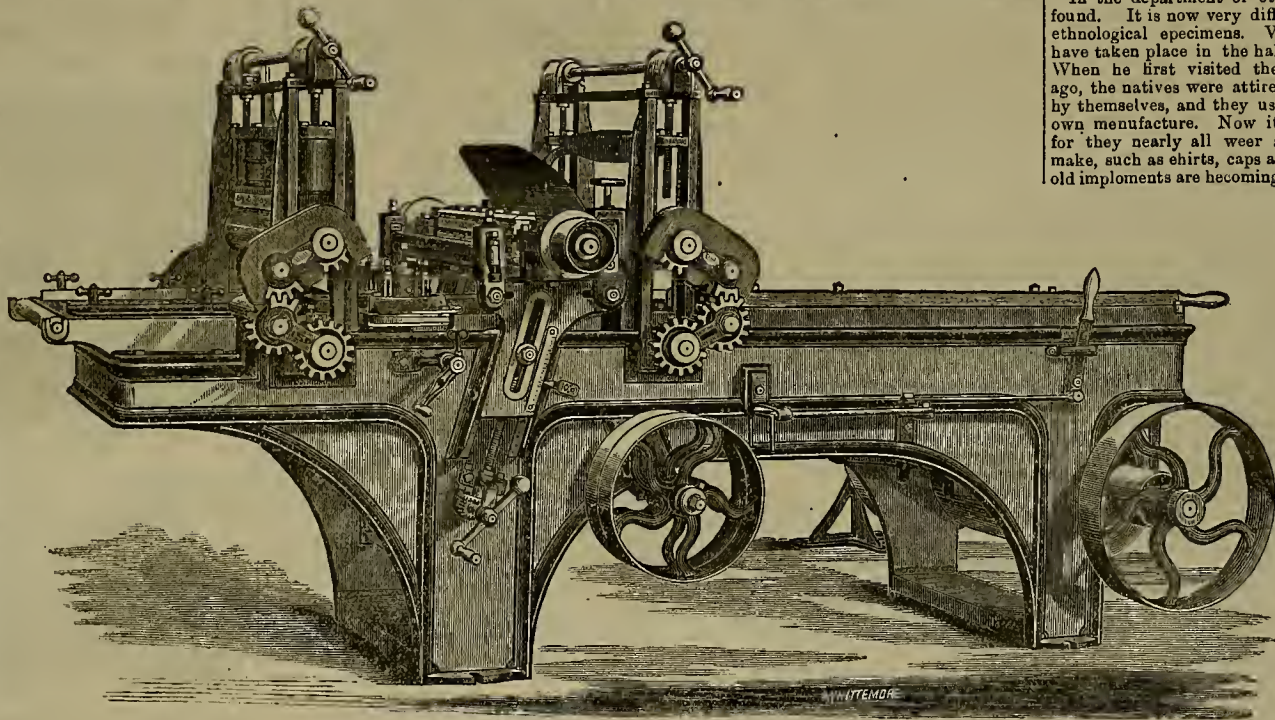
it had ever been before. Previously they had had it down to four degrees below zero three or four times, but this season it had gone down to 12 degrees below. The spring was quite late, and this summer they had had a good average of sunny and of windy weather. In July it is usually very rainy, but this July, at the Seal islands, there was no rain at all; not a drop fell—a very unusual circumstance. Until their vessel approached the floating ice, they saw nothing like an Arctic climate, as the weather was so fine. There was no snow on shore, except here and there a little remained in a cleft in the mountains, while the land was covered with grass and flowers, which did not convey an Arctic appearance. This season has been a remarkably favorable one to the whalers. The whales have been very accommodating, coming out from their usual hiding places to the ice and allowing themselves to be killed. Not only did the whalers secure a full load, but they got out of the Arctic ocean before October, an event which has not happened during 20 years. The presence of the cutter up here had a beneficial effect in preventing the usual trading of liquor on the coast, and as a natural consequence, the natives have supplied themselves with food; in fact, everybody seemed to be happy up there. They boarded a whaler just cutting the eleventh whale, while the boats were on their way to capture another one. Something was said about chronometers, and they offered to regulate the captain's. He said that he did not know very much about the correct longitude, but he guessed he must be in the right longitude, for there were plenty of whales.

In the department of ethnology changes are found. It is now very difficult to procure any ethnological specimens. Very great changes have taken place in the habits of the natives. When he first visited the country, 16 years ago, the natives were attired in clothing made by themselves, and they used articles of their own manufacture. Now it is quite different, for they nearly all wear articles of civilized make, such as shirts, caps and trousers. Their old implements are becoming scarcer and scarcer.

Much damage has been done by foreign traders and smugglers furnishing the Indians with alcohol. Intoxicating liquor is exceedingly injurious to them, as, when supplied with it, they neglect to provide themselves in summer with a store of food for the winter. In the interior the natives seem to have decreased and deteriorated, partly on account of liquor, and partly on account of being furnished with fire-arms. Winchester rifles are more common there than here, and produce many deaths. Their Territory seems, however, to be improving, for now gardens are a prominent part of the establishment, and furnish potatoes of excellent quality and size. As far as the people are concerned, now, they all use the implements of civilization. The old-fashioned tools and implements are becoming very scarce. It is extremely difficult to obtain old-fashioned implements of their own make. When you do get them, they bear marks not of use, but of having been laid aside as superseded. The population is decreasing.

The Rise in Coal.

The sudden and somewhat unexpected rise in coal this week is a blow to the manufacturing interests, and is a hardship to all persons except dealers. Steam coal has gone from \$5 and \$5.50 up to \$8 and \$9 per ton. This is particularly hard on the steamboat and iron men, the foundries especially. It is said that freights have gone up a couple of dollars a ton, and the dealers have taken advantage of this and added a couple of dollars more. All kinds of coal have advanced, though the imported coals are more affected than the domestic. Black Diamond, Coos Bay and Nanaimo coals have advanced considerably. The *Call* says: The advance might be ascribed to many causes, but neither of them would naturally produce the marked appreciation in value of the past few days. At this time in the year coal usually shows an upward movement, and the natural advance has been assisted by the facts that at present the stock of coal on hand is about 200,000 tons less than usual at this time, and but few invoices being expected. The extension of the Southern Pacific railroad and the construction of branch roads have also helped to increase the demand. It is expected by those who should know that prices will further advance from 10% to 30%. Many persons deny that there is any scarcity of the article in the market, but attribute the unprecedented advance of prices to the establishment of a ring or combination of wholesale dealers in this city.



THE CALIFORNIA PLANER AND MATCHER.

patent expansion feed-gears, its adjustable pressure-bar, and its weighted roll in front of the cutter-head and patent chip-breaker.

A peculiar feature of this machine is the fact that the cylinder-head and feed-rolls raise so as to plane lumber six inches thick. As a general job machine for making rustic, flooring and for general planing it is considered perfect. The machines are built and for sale by the Berry & Place Machinery Co., 323 and 325 Market street, in this city, where they may be seen.

SIDE LINES OF MINING CLAIMS.—C. W. Bennett of Salt Lake has filed a complaint in the district court to quiet title to certain portions of what is known as the Emma ledge, Little Cottonwood. Notice was served that an application for an injunction will be made on Nov. 26th. This case will again bring up the question of side lines, decided once in the U. S. Supreme Court, in the case of Tarbet vs. The Flagstaff Mining Co., in October, 1878. The Flagstaff patent was secured across the ledge, and the Supreme Court decided that they were entitled to only that portion of the ledge within the side lines. Bennett claims that the Emma patent is across the ledge, and that his Cincinnati claim was made along the course of the vein. This suit creates considerable excitement in mining circles and will be fought hard on both sides.

THE Ontario Silver Mining Co., of Utah, has declared its 61st dividend (for the month of October), payable Nov. 15th, at Wells, Fargo & Co.'s. The payment of this dividend will make the total amount of the distributions to the stockholders \$3,050,000.

THE Pittsburg mine, American Fork, Utah, was shipping about 15 tons daily prior to the late storm. Not enough snow fell, however, to make raw-hiding profitable, and "more snow" is the cry at the Pittsburg.

THE October product of the Star mine was \$28,820.

long, and was provided with a beak, fins and other appendages. He did not have it with him, but explained that it had been sent to the city. After a parley it was agreed that it should be handed over to them upon returning. They were very anxious to secure such a specimen, and upon returning were chagrined to find it to be a worm, which is known to attain considerable dimensions, sometimes reaching 100 ft. upon the coast of Norway. The beak and fins, however, were not upon the specimen, nor anything not proper to the worm itself. Under the Department of Natural History they did considerable dredging, but did not secure much that was new, since Dr. Dall had previously dredged this coast very thoroughly on former expeditions.

They found a single specimen of the *Voluta*, named after R. E. C. Stearns, of the University of California. Up to this time only one specimen of this species had ever been found, and that had been procured from the stomach of a cod. This time they looked carefully, and were rewarded by finding another specimen of the shell.

In ornithology not very much was done, although they found a great number of specimens of described species. Dr. Dall said that some few years ago, when in Oxford, England, he had seen a specimen of a small snipe having a peculiar bill like that of a spoon-bill duck. It came from Sir John Barrows' collection, and its habitat was marked Behring's straits. Dr. Dall has frequently looked to get a specimen of this bird, the one at Oxford being the only one in a collection. This year they succeeded in getting one which was shot by an Indian. They afterward found, from the master of the steam whaler, *Mary and Helen*, that he had seen the birds at Pt. Barrow. This adds another to the list of American birds, there having been previously no specimen in any American collection. Among other birds found one or two may be new to science, and several others are certainly not common.

In meteorological science, all he could say was they had had a very queer season. Last winter the thermometer was lower in Sitka than

Mining in Calaveras County.

The Calaveras *Chronicle* says: Interest in mining operations continues without abatement, and the indications are that in the not distant future some heavy enterprises will be undertaken. It is a fact, plain enough to all who have any knowledge of the ground in this vicinity, that there are the best inducements for the investment of capital that are offered anywhere in the State. Of course it takes money, but with the right kind of men to manage things there is a certainty of making very remunerative investments. The ground has not been half worked and there are yet millions of dollars locked up in the gravel hills. The fact is being realized and the prospects of the mining interest are brightening every day. There is no doubt at all but that there will be some big enterprises undertaken shortly. It is gratifying to note the turn matters are taking in this industry, and we have good reasons for predicting better times. Most of the large hydraulic mines are not yet in activity, but are waiting for sufficient water to start up. Preparations are being made in all for the advent of water, and during the winter heavy work will be done. The Penobscot hydraulic claim on Tunnel ridge is not at present in operation, but is in readiness. The Bonanza hydraulic on the same ridge has been running without interruption all summer, and is paying property. The Mammoth claim has also kept up operations, and at present a new flume is being laid in order to wash off some gravel on the rim of the claim. An immense amount of work has been done in this mine during the year. In the Duryea claim the work of picking and carting the bottom gravel is completed. The water pipe has been taken up and tarred over, preparatory to hydraulicing. The Gleason mine will start next Monday, the hoisting works being completed, pipes laid and everything in readiness for pushing things briskly. The works were constructed by first-class workmen, and under the supervision of experienced miners. The works will be run by water power, for which they are admirably situated. The water conducted through pipe will have a pressure of 240 ft., which, when directed against a hurdy-gurdy wheel, will do the work like a charm. The incline tunnel is down already about 90 ft., the dirt being drawn out by means of a windlass, and it is calculated, when the works are started, to put on three shifts and reach pay dirt in a month or six weeks. In La Belle France the material used in the upper tunnel is being removed to the new lower tunnel, and a general cleaning made in the old works which will be abandoned. The company's large gulch flume has been moved farther down and in a few days a full force of men will be at work in the diggings. The Eureka hydraulic, on the Calaveras is not quite ready for running yet. A long, deep "cut" had to be dug in order to facilitate running off the gravel, and the rock through which the "cut" is run necessitates a great deal of blasting. It is now nearly completed, however, and most of the flume laid. The Eureka will be ready for operations soon.

Trueing by Blows.

Our machinists make a great mistake in using blows instead of pressure in straightening shafts or bars. Blows cannot be struck on cold bars of iron or steel without weakening them. It is a too common practice to take a long bar over the anvil and with sledge blows try to correct a crook while one, or perhaps both ends are unsupported. Every blow thus given extends its effects throughout the length of the bar, but concentrates its force at the point of the blow. If examinations were made it would be found that the after life of a bar so treated would be affected by the violence done to it at this anvil point. There are short crooks, sometimes, that require heroic treatment; they are too short to yield to bending. If the iron is soft, or the steel mild, this straightening can be made on the anvil, but in most cases it is well to heat the place where the crook occurs, and in all cases it is well to support both ends of the bar. A very ready and cheap device is a horse or horses, made like those the carpenters use and mounted on the castors so that the weight of the bar would induce motion either to or from the anvil. These horses should be of about this height of the anvil so that the bar would have a rest on the anvil and a rest on the horse.

The common way of allowing the bar to have its only bearing on the anvil is manifestly improper, as the suspended weight receives the full impact of the blow and is affected in its entire length. This result is to compel the impact of the straightening blow to lift the entire dependent weight of the bar, thus adding to the force of the blow the inertia of the bar. The result, it is apparent, is a terrible straining of the bar just at this point of the blow of the hammer.

It is better, where it is possible, to straighten bars by pressure. The railroad people use a straightener, which is simply a cam lever, while the bar is resting on supports on either side. Some concerns use a modification of this in their iron room, or forge shop, but a neat application of it would not be out of place in the machine shop, and would save the strain now

Wonderfully Rich Quartz.

For some time past quartz of extraordinary richness has been coming out of the quartz claim of Ford, McDonald & Mullen, on New York hill, adjoining the Rocky Bar mine on the west. This quartz has been boxed up and deposited in the vault of Judd's store, at Boston Ravine, to the number of 35 boxes, beside several hundred lbs. of large pieces, the total weight of all being over 2,000 lbs. Although there has been, from time to time, rock of great richness taken out in the Grass Valley district, we have never seen any equal to that contained in this collection. The late strike in the Rocky Bar was very rich, but this lot surpasses that, as some pieces of a few lbs. weight are of the value of \$300 and \$500. No accurate value has been made of this lot of rock, but it is believed that it is worth from \$25,000 to \$30,000. The specimens are truly magnificent, and are a surprise to the oldest and most experienced miners. Seven boxes of these specimens were brought up from the mine a few days ago, and more of the like character will be taken out at this next stripping of the ledge. It is intended to put the rock through the batteries in a short time, but there are several hundred lbs. of it which would be of more value to sell for jewelry than to reduce for bullion. The rock was taken out at a depth of 110 ft. from the surface. There has been sufficient development in the claim to prove that it is the richest spot of ground in California, as no piece of quartz ground has ever yielded as much gold from the same space, and there are no indications that the bonanza is near exhaustion; on the contrary, the latest developments are the richest that have yet been made. There is much gold in that immediate locality, as shown by the late strike in the Rocky Bar mine, and the regular and large yield of the New York Hill mine, which now pays regular monthly dividends. Beside these claims are those of the Vulcan, Grass Valley, Twilight and Tribute, all contiguous, and on the same rich belt, forming a set of claims that no doubt will all prove of great value. New York Hill and its surroundings, is now the point of the greatest interest in the Grass Valley district.—*Grass Valley Union*.

MILL CREEK.—A. Maestretti, formerly of Bodie, reports Mill Creek as thriving and prosperous. There are about 175 men at work and no idle men in the camp. Pete Tautphaus is putting up six arastras, and has now two furnaces completed. He will commence working on today from several mines. The May Lundy mill, of five stamps, is completed and running to its full capacity, crushing 10 tons of ore per day. There has been no clean-up as yet, but the pulp gives promise of a rich return. Andy Young has charge of the mill and is running it with his usual care, and his experience in working this class of ores ensures the perfect success of the mill. Townsend has deserted the editorial chair and is now running an arastra up Lake canyon. The May Lundy mine is being opened up with astounding rapidity. They have over 1,200 tons of rich ore at the mill. F. W. Pike, Superintendent of this mine, is doing scientific work in opening the levels and stopes. His confidence in this district is shown by his works, having just purchased the Lucky Morton and Lake View mines, which he proposes opening in the spring. There are now four mines opened and taking out ore—the Homer, Jackson, May Lundy and Little Emma. The Homer ore will be worked by Tautphaus' arastras with pans and settlers. Maestretti thinks Mill Creek will yet beat Bodie.—*Standard News*.

NEGLECTED.—While almost every other gravel-bearing section of Plumas is being prospected, and while locations are being made in almost every quarter, we can hear of but little being done toward opening the immense blue gravel channel which follows the course of the Middle Fork. The failure of the Franklin company to bottom it, seemed to put a damper on all other locations, and it has been dropped. It will not long be in this condition. There are unmistakable indications and evidences there of one of the most extensive channels in the mountains, and where it "slopped over" the rim at the Blue Gravel mine, it proved itself exceedingly rich. At no other point has the gravel been found, the immense river-bed being filled to a depth of 200 ft. and more with lava. Why don't some company test its merits with a boring machine, such as in use at Spanish Peak? The cost would be light, and a few holes bored to the bedrock would probably prove the existence of rich blue gravel, show the depth, and put the ground in shape to show to capitalists that an investment there would be a paying one. If that section of country had been located in Nevada or Sierra counties, it would have been bottomed and worked out years ago. Mile after mile of this channel is there waiting for some enterprising capitalist to prove that the bottom can be reached, and when that is demonstrated, there will be no trouble in finding owners for the numberless claims that will be located.—*Plumas National*.

ARIZONA has been specially honored of late by the visits of high officials. The President, Secretary of War, General of the Army and the Commanding General of the Department have all visited various points. From a private letter from Tucson, we learn that Gen. John C. Fremont, Governor of the Territory, had been for some days in Tucson. This is his first visit to the "ancient and honorable pueblo" for 31 years, at which time he came through there

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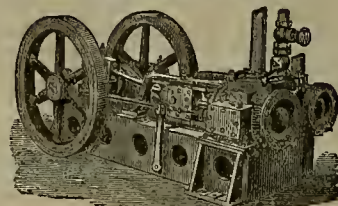
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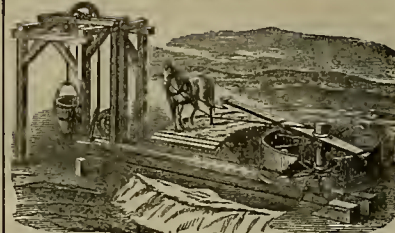
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports (for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.)

FOR WEEK ENDING NOVEMBER 9th, 1880.

234,376.—STREET PAVEMENT.—A. Bannister, Alameda, Cal.
234,115.—FROST DRIER.—R. E. Burns, S. F.
234,250.—SHEARS.—W. V. Cruess, San Marcos, Cal.
234,255.—DAY WASHER.—A. M. Denman, et al., Oakland, Cal.
234,377.—BARREL TAP.—Z. Fetterly and O. Dutton, Yuba, Cal.
234,133.—WINDMILL.—E. J. Masters, Stockton, Cal.
234,378.—COMBINATION TOOL.—G. H. Pierce, S. F.
234,297.—AUTOMATIC FAN.—J. W. Scott, Seattle, W. T.
234,151.—BORING WELLS.—W. W. Vaughn, Stockton, Cal.
234,379.—BALT.—C. N. West, S. F.
9,454.—ONE FURNACE.—(Re-issue).—J. Winterburn, Cambria, Cal.
234,159.—CAR AXLE BOX.—C. M. and R. M. Wood, Healdsburg, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

ORE-ROASTING FURNACE.—John Winterburn, Cambria, San Luis Obispo county, Cal. (Re-issue.) No. 9,454. Nov. 9, 1880. This invention relates to certain improvements in furnaces for roasting ores which contain volatile substances of value, such as ores of mercury. It consists in the introduction, above the fire-arches, of a prison-shaped deflector, which serves as a combined distributor for the ore and discharge pipe for the vapors which it leads into the condensers. It further consists in the use of a steam-pipe or passage which opens into the upper part of the furnace, leading thence into the condenser, and this pipe conducts away the steam arising from the drying of wet ore, so that no especial drying apparatus need be used previous to its introduction into the furnace.

CAR-AXLE BOX.—C. M. and R. M. Wood, Healdsburg, Sonoma county, Cal. Patented Nov. 9, 1880. No. 234,159. This device relates to certain improvements in car-axle boxes, and it consists in the employment, in such a box, of anti-friction rollers through which the weight of the car is supported upon the car-axle journal, the bearings for the axles of these supplemental rollers being supported radially from the center of the main axle. It further consists in providing for such an axle an elastic thrust-bearing, which will relieve the housings of the side wear and strain from the lateral movements of the cars when in motion. The lower housing is so fitted to the upper one, that it may be removed by simply taking out two bolts.

DRY-ORE WASHING MACHINE.—A. M. Denman, W. C. DuBois, C. C. Gee and F. C. Pettigrove, Oakland, Cal. Patented Nov. 9, 1880. No. 234,255. With this device auriferous earths of all kinds are treated successfully without the use of water, and tracts of gold-bearing soil remote from water supply may be utilized. The invention consists in a peculiar combination of sieves and pulverizers, with a fan-blower, and in certain details of construction whereby the particles of gold are separated from the earth to which they are found.

ANIMAL SHEARS.—Wm. V. Cruess, San Marcos, San Luis Obispo county, Cal. Patented Nov. 9, 1880. No. 234,250. The improvements here made in sheep shears consist in so arranging the spring which keeps the cutting blades apart, so that the said spring is made removable, and springs of greater or less strength may be used to suit different operators. Removable cutting blades are employed which are so secured that they may be removed when they become dull and sharp ones attached to the handles, thereby obviating the necessity of keeping a great many pairs of shears on hand.

SAYS THE BUTTE (W. T.) MINER: There has been a rumor in Glendale that the Hecla company has sold out for \$1,000,000. It has been understood that the above figure was the price at which the Hecla mines and works were to be sold, and it looks like a very small price for such a large concern. The Phenix sold for half a million in cash less than three years ago, when the deepest shaft was not over 70 ft. The Alta Montana mines at Wickes, with works similar to the Hecla, is stocked at \$5,000,000.

THE BALTIMORE AND OHIO R. R. is a profitable one. The gross earnings of the road last year were \$13,318,000; net earnings, \$7,937,000; increase over last year, \$4,124,000; increase in tonnage over half a million tons, and

An Improved Coffee Pot.

An engraving on this page represents the "Boss Coffee Pot." Its essential features consist of a peculiarly formed bag of a textile fabric, suitably expanded by a ring placed inside the coffee pot, this ring resting on the swedge of the pot. The coffee is finely ground, placed in the bag and hot water poured in upon it, dropping through into the bottom of the pot. The bag is made with a broad flat bottom, and does not come to a point, so that an effective straining surface is obtained.

This coffee pot has been extensively introduced throughout the East; and Mr. Ricker, the agent, has a large number of endorsements from various persons. He has only been in the city a few weeks, and is introducing the coffee pot here.

We were shown coffee made by ordinary boiling for five minutes; also made in a French coffee pot with wire-gauze cup; and then in this coffee pot with its cloth strainer. In each case a pint of water was used. That from the French coffee pot was comparatively weak; that which was boiled was muddy, while that made in the pot we are describing was stronger



and clearer, with a coffee taste and aroma. Another pint of water was added to the coffee made in the "Boss Coffee Pot," and even then the resultant decoction was apparently stronger than in the case of either of the others. This coffee was made very quickly. In fact, it is somewhat difficult to realize the difference in the three different ways described without seeing it made. Mr. Frank Ricker, at George H. Tay & Co.'s, southwest corner California and Davis streets, will take pleasure in showing any one interested the different ways of making coffee and the various results attained. The device is fully protected by three different patents. The great points made by the agent are economy in material and excellence of



The "Boss" Coffee Pot.

product. This device is highly endorsed by Geo. H. Tay & Co., C. J. Hawley & Co. and Bowen Bros., and can be procured at either of these places.

The Debris Dam on the Yuba.

An interesting report of the successful completion of the debris dam on the Yuba will be found on page 322 of the present issue. The following description of the manner of its construction, condensed from the Marysville Appeal, will be of interest to our readers: "The dam is located nine miles above Marysville, just at the beginning of the foothills. On the north side of the river is a bluff, from which the dam starts. The dam was built as follows, beginning first with the mattress: An excavation was made across the river, about one foot in depth and 60 ft. wide, the ground at that depth being very solid. In this were trenches in which were placed logs spliced together at the ends, and securely staked down. A mattress was then made upon an inclined scaffolding. Willow brush was laid upon the scaffold, butt ends and tops alternating so as to be close together and bind well. None but assorted straight willow brush was used. This mattress, about 60 ft. in width and two ft. in thickness, was then sewed together with strong wire until it was pressed to one foot in thickness. The frame or scaffold was drawn from under by horses, and the dense mass sank upon the strainers and was sewed down to them

mattress was necessarily made in pieces, these were all sewed together at the ends, making it continuous. This was all covered with two ft. of earth, and continued driving over it has packed the ground. This is intended to prevent the wash from the water that flows over or through the dam. On top of the mattress and earth, but a few ft. below the upper edge of it, begins a layer of logs laid together closely, sewed with wire, and sewed to mattresses beneath. On this are stringers and then two more layers of logs all with butts down stream and top ends running into the ground up stream. They were all secured in the same manner to the mass below and loaded with dirt. The line of the butt ends of each successive layer further up the stream, of course, forming a sort of stairway from the bottom. Upon top of the layers of logs are layers of brush rising in the same way. One end rises in a slanting way to the upper part of the dam, the other being buried in the earth up stream. The brush in these was also carefully selected, butts and tops alternating, and in being sewed was compressed by means of a pole used as a lever by five or six men, so close that a mouse could not creep through. Sand was then shoveled upon them until the crevices were filled, stringers were put on, and other layers added. There are in the dam, at the north end, five layers of logs and five of brush, besides the mattress and various lines of stringers and weights.

The length of the dam is nearly two miles, and it averages eight ft. in height. There is no part of it that is not firmly wired to every other part. Many of the willows used, it is thought, will send forth shoots to strengthen the dam. In all its parts the dam is a splendid piece of engineering. The work has been done thoroughly, and is highly creditable in every way to both contractors and engineers. It is claimed for the dam that when the water is at flood height it will slip through the dam and flow over it all along the crest at a depth of not more than one foot. The manner in which the layers of brush were sewed together is described as follows: The brush was placed on an inclined frame-work. Above stood workmen with long iron rods with a needle-like eye at the pointed end, the side of the eye being open. Into this eye the workmen passed the malleable wire; they then thrust it through the mass of brush, and workmen beneath them under the frame-work, seized the wire, pressed it aside from the needle and inserted willow toggles—sticks 18 inches long. The workmen above then drew back their needles and wire and pulling taut on the latter with their feet each side of the wire, the brush was of course drawn together and thus packed to a thickness of one ft. They then stepped forward two ft., sent down their wire threads again, other toggles were inserted, and thus regular stitches were made from side to side. In each mattress are three or four or five—according to size—of these lines of stitching.

A Popular Route.

We recently passed over the South Pacific Coast (narrow gauge railroad) via Alameda to Wright's station, near the summit of the Santa Cruz mountains. The road is very thoroughly constructed, and the management worthy of special commendation. In the "warm belt" at Los Gatos we find many improvements going forward in both town and country, stimulated, no doubt, by the new and very fair accommodations furnished by the building of the narrow gauge road. We found the Los Gatos hotel well filled with guests—a compliment to the thrifty town and landlord.

The new time table for the winter months went into effect November 7th, as follows: From San Francisco a daily train leaves at 8:15 A. M. for Santa Cruz and all intermediate stations, and at 4:30 P. M. a daily train leaves for Los Gatos and all intermediate stations. Every Sunday a through train leaves at 5 A. M. for Santa Cruz and all intermediate stations, for the accommodation of hunters, enabling a return to San Francisco by 5:35 P. M. the same day. The usual excursion, of round trip tickets, are sold at reduced rates, to San Jose and Santa Cruz and return, good from Saturday until Monday, inclusive. Alameda Ferry will leave San Francisco at 5:45, 6:45, 7:37, 8:48, 9:40, 10:38, 11:45 A. M., 12:35, 1:35, 2:35, 3:48, 5:35, 6:35, 9:30, and 10 P. M. (Sundays only, *daily, Sundays excepted.) An up town ticket office has been established at 208 Montgomery street, and a ticket office in Oakland, northeast corner of Thirteenth and Broadway.

COPPER IN PLANTS.—M. Dieulafoy reports the presence of copper in plants which grow on rocks belonging to the older geological formations. He says that plants growing in soil formed by the decomposition of primitive rocks contain such quantities of copper that it is possible to detect the copper in one grain of their ash by means of ammonia.

THE BLUE TENT GRAVEL M. CO., on Wednesday shipped \$25,000 in bullion, being the yield of their hydraulic claims for 13 days' run. The claims are supplied with water from the South Yuba Company's canal.

Work has been temporarily suspended on the Gahilan coal mine near Monterey, owing to a cave in the main tunnel. A recent assay of an average sample from this mine shows 60% of an

News in Brief.

RAIN and snow in North Carolina. SMALL-POX is killing the Canadian Indians off by the hundreds.

A SHAPE shock of earthquake was felt at Callao on the 15th.

THE revenue receipts of Italy exceed the estimates by 10,000,000 francs.

THE Amador hotel at Denver was damaged \$10,000, by fire, on Monday.

THE New York banks hold half a million over their legal requirements.

THEY had a cyclone and an earthquake in Sitka, Alaska, on October 26th.

THOUSANDS of negroes, it is reported, are leaving Louisiana and Arkansas.

THE Eastern trunk lines have restored passenger rates to the former figures.

TWO violent shocks of earthquake were felt in Agram, Austria, on Monday night.

A COMPLETE compilation of the figures of the census will be made by the middle of December.

JOHN W. MACKAY, the bonanza king, has left the Comstock for a while and gone to Paris.

GRAHAM MURDOCH, who was shot by his brother at San Jose, on Sunday last, is recovering.

THE Ogden City council, Utah, has adopted a proposition for lighting the city by an electric light.

ADJUTANT-GENERAL DRUM favors applying the rules and powers of the regular army to the militia.

STRONG opposition to the presentation of the "Passion Play" is developed among the New York clergy.

SITTING BULL swears that he will fight the United States troops forever, and die rather than surrender.

A COMMITTEE of scientific men have asked the President to appoint Gen. H. L. Abbott as Chief Signal Officer.

A FIRE in the central stable of the Omnibus Company at Paris Tuesday, caused damage to the amount of \$50,000.

THE German Austrians made a demonstration in Vienna on Sunday, against the Slav tendencies of the government.

EXTENSIVE fires have been burning on Uncle Sam mountain during the past week; also east and northwest of Lower lake.

TWO-THIRDS of the town of Newport, Ark., was burned on Monday night. Two hundred families were rendered homeless.

JUDGE LEVERING, of Calhoun, Los Angeles county, has received an order for four stands of bees to be shipped to New Zealand.

THE Minnesota insane asylum, which cost \$500,000, was burned this week. Ten or fifteen of the inmates were burned to death.

GEN. MCCOOK reports that the Army schools are doing good work, but that a change in the system of providing teachers is needed.

JENNE SPENCER, a daughter of Richard Spencer, Secretary of the gas works, hanged herself in Burlington, Ia., on Saturday.

A FIRE at Mammoth City, Mono county, on Sunday, destroyed all the upper portion of the town, involving a loss of about \$45,000.

AT New Orleans the passenger depot of the New Orleans, St. Louis and Chicago railroad was burned, with two coaches. Loss, \$30,000.

REPORTS on the French beet crop class it among the worst as regards quality. Advances from Germany and parts of Austria are better.

HANLON beat Trickett in the sculling match on the Thames Monday. Hanlon's time was 26 minutes 12 seconds; Trickett's, 26 minutes 19 seconds.

THE arrival of the French monks at Alicante and Barcelona caused a hostile popular demonstration. They were compelled to re-embark from the latter place.

AT Lexington, Santa Clara county, on Monday, James A. Newell, aged 12 years, accidentally discharged a loaded gun, and instantly killed his sister Nellie, aged 7.

GENERAL ORD's report says that in western Texas parties of troops driving the hostile Indians have been frequently followed by surveyors locating railway routes.

JESE POMEROY, the Massachusetts boy murderer, has been foiled in an attempt to escape by sawing through a thick boiler casing with a saw improvised from a knife.

THE Jesuits have attempted to re-enter Portugal; the government has instituted vigorous efforts to strictly enforce the decree of 1834, abolishing all religious orders.

THE President has appointed ex-Secretary of the Treasury Boutwell counsel for the United States before the newly-organized Franco-American Mixed Claims Commission.

THE United States District Court for Western Pennsylvania has affirmed the right of the Western Union Telegraph Company to use the wires of the Baltimore and Ohio railroad.

IT is stated that a large amount of rifles have been introduced into Galway from the United States, and troops have been sent in that direction. Rifles are also said to have been shipped from Italy.

SECRETARY THOMPSON's omission to invite the Admiral, Vice-Admiral and other leading officers of the navy to the recent naval review off Fortress Monroe, has created a great stir in army and navy circles.

GENERAL SCHOFIELD, in his West Point report, recommends the retirement of colored men from the army in all its grades, but advises more care in appointments, for most of the colored men appointed cannot nearly pass the

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive **DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY** Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the **MINING AND SCIENTIFIC PRESS** which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

HOW TO STOP THE PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Chew JACOBSON'S BEST Sweet Navy Tobacco

METALS.

(WHOLESALE) WEDNESDAY M., Nov. 17, 1880.

IRON.—		
American Pig, soft, ton.....	\$2 00	@33 00
Scotch Pig, ton.....	25 00	@27 00
American White Pig, ton.....	—	@—
Oregon Pig, ton.....	—	@—
Refracted Bar.....	4 00	@8 00
Horse Shoes, keg.....	7 00	@8 00
Nail Rod.....	—	@—
Norway, according to thickness.....	8 00	@9 00
STEEL.—		
English Cast, lb.....	16	@18
Black Diamond, ordinary sizes.....	13	@15
Drill.....	9	@10
Flat Bar.....	—	@16
Flow Steel.....	9	@10
ONPPER.—		
Ingot.....	—	@52
Sheet.....	—	@20
Sheathing, Thine 14x4.....	—	@42
Nails.....	—	@—
Bolts.....	38	@42
Old.....	—	@18
B.T.....	—	@22
Freeplate, 100 line.....	18	@13
LEAD.—		
Pig.....	4 00	@5 00
Bar.....	—	@6 00
Pipe.....	—	@8 00
Pipe, Roll.....	—	@9 00
Shot, Discount 10% on 500 Bags.....	—	@2 10
Drop, per bag.....	—	@2 10
Buck.....	—	@2 30
Chilled.....	—	@2 30
TIN PLATES.—		
10x14 I O Charcoal.....	—	@10 50
10x14 I O Ooke.....	10	@10 00
Bacon Tin.....	—	@25 00
Australian.....	—	@20 00
I O Charcoal, Roofing 14x20.....	—	@10 00
20x28.....	20	@21 00
ZINC.—		
By the Oak.....	—	@10 00
Zinc Sheet 7x3 ft, 7 to 10, lb. less than cast.....	10	@11 00
NAILS.—		
Assorted sizes.....	4 00	@4 75

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, Room 37, San Francisco, Nov. 15, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 61) of Fifty Cents (50c.) per share was declared, payable on Saturday, November Twentieth (20), 1880. Transfer books closed until the Twenty-Second (22) instant.

W. W. TRAYLOR, Sec'y.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

San Francisco, November 3d, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 11) of Twenty-five (25) Cents per share was declared, payable on MONDAY, November Fifteenth (15), 1880, at the office of the Company, Room 10, No. 323 Montgomery Street, San Francisco, California. Transfer books will be closed from Thursday, November Eleventh (11), 1880, until Tuesday, November Sixteenth (16), 1880.

JOSEPH NASH, Sec'y.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,

SAN FRANCISCO, CAL., NOVEMBER 10, 1880.

At a meeting of the Board of Directors of the above named Company held this day, Dividend No. 37, of Fifty cents (50c.) per share, was declared, payable on Monday, November Fifteenth (15th), 1880. Transfer books closed on Thursday, November Eleventh (11th), 1880, at three o'clock, P. M.

WM. WILLIS, Sec'y.

Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

Office of the Standard Consolidated Mining Co., San Francisco, November 1, 1880.—At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. 21, of Seventy-five (75) cents per share, was declared, payable on Friday, November Twelfth (12), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York. WM. WILLIS, Sec'y.

Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

Land Purchasers Association.—Location of place of business, San Francisco, California.

Notice is hereby given that at a meeting of the Directors, held on the Ninth (9) day of November, 1880, an assessment of Five Dollars (\$5.00) per share (being a part of the 44th installment on the subscription to the stock), was levied upon the capital stock of this Association, payable immediately to the Secretary, at 318 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid, on Friday, the Tenth (10) day of December, 1880, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the Twelfth (12) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

N. B.—This assessment is to pay the taxes on the property of the Association for the current year.

Amusements.

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CHAS. H. GOODWIN.....Treasurer.
J. P. CHAPMAN.....Assistant Treasurer.

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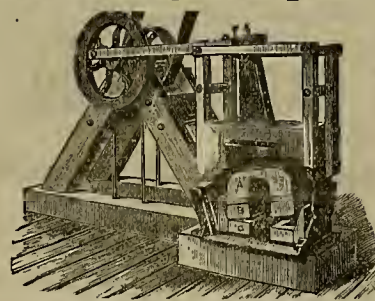
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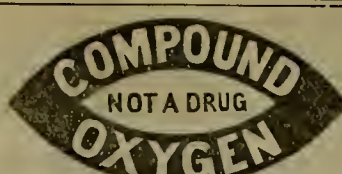
Price, 850-Pound Hammer, - - - \$500.
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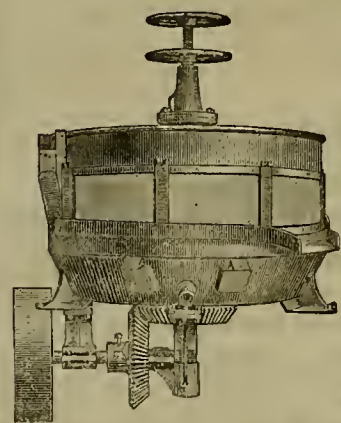
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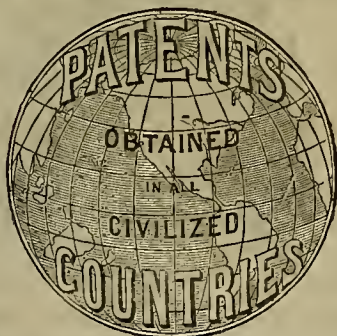
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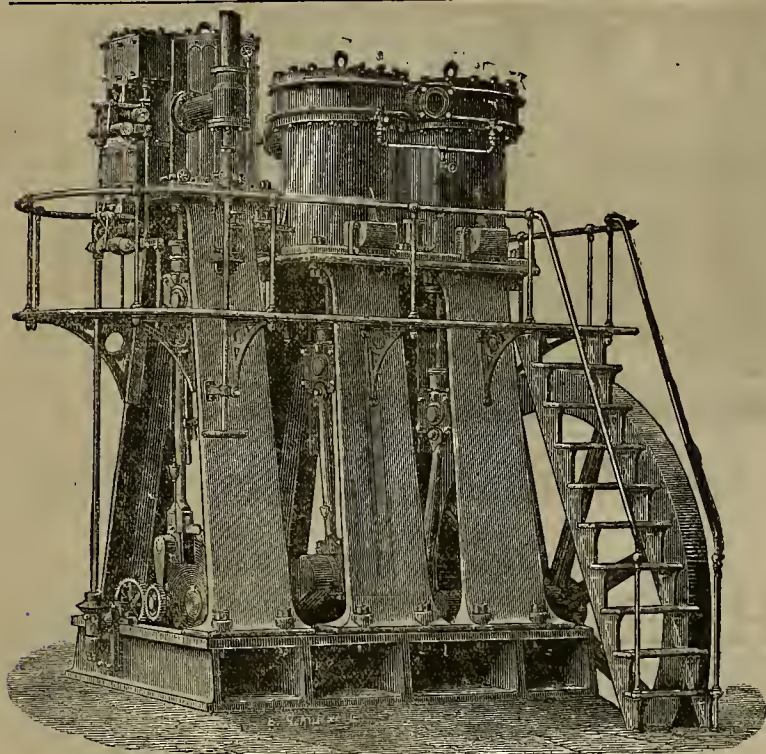
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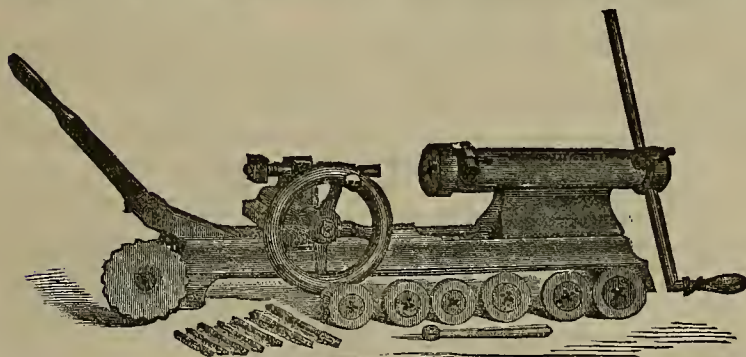
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Mineral Lands and School Sections.

The case of the Ivanhoe Mining Co. vs. Keystone Con. Mining Co. has been before the courts for some 10 years past. The company owning the Keystone has had it in possession for 10 years, buying it for \$106,000, and since they purchased the mine, it has paid over 150 dividends.

The controversy in the case related to the title of a certain tract of mineral land in Amador county, in this State, known as the eastern half of section 36, upon which is the town of Amador. The land in dispute is now, and has been for some years in possession of the Keystone Co., being held by them under a United States patent. The controversy was begun in the local land office at Sacramento, and was carried thence before the Land Commissioner at Washington, and appealed from him to the Secretary of the Interior. The adverse claimants, having failed at each successive step, the battle was renewed by a suit brought in the District Court. The case was transferred to the Federal Circuit Court, and finally reached the Supreme Court.

The Ivanhoe Co. claimed to hold the same land under a title from the State of California, founded upon a grant of land by Congress to that State for school purposes on March 3, 1853. As the decision of the case affects the title to other large tracts of mineral land included in grants made by Congress to the State of California, counsel of that State and the United States were allowed to participate in the argument.

The following is a text of the decision in the case, rendered this week:

The principal question at issue is whether the act of Congress of March 3rd, 1853, which granted to the State of California sections 16 and 36, vested the title of such lands absolutely in the State, without reference to their mineral or non-mineral character, or whether such lands were exempt from the operation of the school grant from the very fact that they were mineral lands. This Court, after an elaborate review of various acts of Congress bearing upon the case, including the act of March 3rd, 1853, under which the State and plaintiff in error claim title, expresses the opinion that it was the general and settled policy of Congress, after the discovery of precious metals in California, to reserve from sale and pre-emption entry, and to exempt from the operation of land-grant acts, all land known to be mineral in its character, and that there is no reason whatever to suspect that Congress intended to depart from this settled policy in the grant to the State of California of the sections now in controversy. It follows, therefore, from the findings of the Court below on undisputed facts of the case, that the land here in dispute, being mineral land, and well known to be so when the survey of it was made, did not pass to the State under the school section grant of 1853. It is equally clear in the opinion of this Court that the land in controversy is exempted from the grant under the provisions of the 7th section of the Act of 1853, for the reason that it was occupied, improved and under cultivation at the time the survey of it was made. Under such circumstances the title of the State, in the opinion of this Court, does not vest, but the alternative right to other land as indemnity, does. The settlement, building and cultivation, found as facts by the Circuit Court, bring the case within the provisions of the 7th section of the act of 1853, and necessarily renders void the title asserted under the State by the plaintiff in error. The judgment of the lower Court is affirmed with costs.

The opinion was delivered by Justice Miller. The gist of the decision is to the effect that the State had no right to take mineral land by virtue of its claim to school sections, and its patents to any such sections are invalid. This decision is a very important one and affects many large tracts of mineral land in this State. The Bodie mines are situated on a school section, and the same adverse claim has already been made to a number of the locations there.

The Hendy Ore Crusher.

The engraving on this page represents the "Hendy ore crusher," manufactured in this city by Joe H. Hendy. The machine is a very simple one, as the engraving shows. The outer jaw only moves, the inner being stationary. There is an eccentric in the shaft on each side

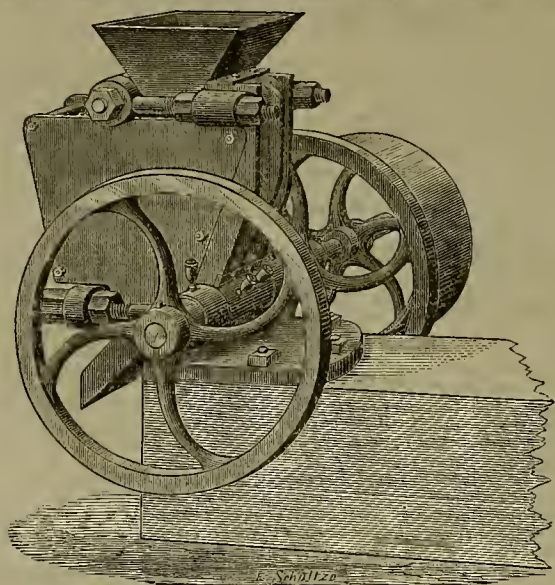


FIG. 1.—THE HENDY ORE FEEDER.

of the machine, and from these wrought-iron stays reach out and support the outer-swinging jaws, uniting on a cross bar. These stays are made adjustable by nuts.

It is very easy to get at this machine to change the shoes and dies. The side plates are removed and the lower outside unit elacked, which frees the swinging jaw. The jaw is then swung back over the top, leaving the stationary

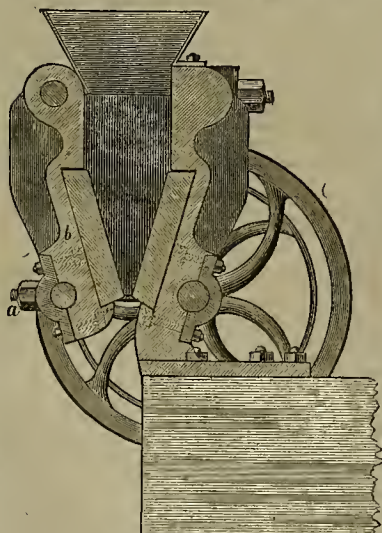


Fig. 2.—"Section of Hendy Ore Feeder."

jaw accessible, while the swinging one is open above.

Any desired size of this machine is made. It is the cheapest crusher in the market. A great point is its simplicity. The motion is very light, but it gives great power. The machine is comparatively light, but it is so constructed as to be strong and durable.

At a depth of 600 ft. the Vancouver Coal Co., have reached an 11-ft. seam of excellent coal near the old workings.

Drill Holes.

There has been from time to time a good deal of grumbling about the use of diamond drills in mines. The trouble has been that the management have been able to find out more than they wanted to make public, and have, by the information gained, made piles of money at the

expense of other stockholders. The drill is a pretty good thing, however, for prospecting, if fairly used. It may be used to guard against water, too. A case of this kind is related by the *Virginia Enterprise* this week: "In order to guard against water, and to escape the trouble in which the Belcher and other mines of the Yellow Jacket group are now involved, the diamond drill will to-day be set up in the bottom of the Union shaft. A hole will be drilled to the depth of 200 feet, which will thoroughly inform the management in regard to the nature of the ground into which they are about to sink. In driving the shaft down without this precaution they are liable at almost any time to fire a blast that would be followed by a flow of water that would seriously inconvenience them, if it did not drive them out of their lower workings."

"The proposed drill hole will not only show what water there is in the track of the shaft, but will also make known the character of the ground to be passed through, and this being known a very close calculation can be made in regard to the length of time that will be required to sink the shaft to a given depth. Also, it is not impossible that the drill may cut something better than mere porphyry."

WORLD'S FAIR OF 1883.—The following rather curious item of news is telegraphed from New York as having appeared in the *Times* of that city: It is certain, however, that the business men of the city have not come to the front as promptly as they were expected to, and this fact is strongly corroborative of Judge Hilton's opinion, that the project in the present shape is not possible. It is freely charged that the Committee on Sites selected Central park for the purpose of exciting popular clamor against the fair, under cover of which they might wash their hands of the whole business. It is certain that the Park Commissioners will not consent to use Central park, and it is very doubtful whether they have the legal right to do so, even if they were inclined to yield to the demand of the United States Internal Commission.

The wild hemp on the Colorado river bottoms, in Arizona, is being worked successfully by Threlfall's ramie machine.

Cost of Dredging.

A somewhat remarkable fact is disclosed by the annual report of the California Harbor Commission. It is that a certain class of work can be done cheaper by the State than by private individuals. Not that there should be anything extraordinary in this, since the State wants to make no interest or profit, while the individual or the company does; but it seems somewhat strange to note the fact that public work is so economically done as to be less than that of private persons.

We allude to the cost of dredging in which a great reduction has been made in the past year, including every item of expense of wages of men, coal, repairs of tugs and dredgers, and ship chandlery, the cost per cubic yard of mud removed from the docks has been 6.89 cents against 7.16 cents the previous year, and 9.02 cents the year before that.

When it is recollected that the State need to pay 30 cents, 24 cents, 20 cents, and that when it got down to 14 cents per cubic yard, it was thought "dirt cheap," it will be seen that the Harbor Commissioners, by economical management, have created a revolution in the dredging business. Since the board was organized, it has spent \$622,075 for actual dredging, aside from the cost of construction, and repairs of tugs, dredgers, scows, etc.

It is noticeable, too, that this economical work is done with the old style of clam-shell dredger, and has not been accomplished by any intricate mechanical wonders, like some of the "improved" dredgers. In building dredgers, it seems as if inventors tried their best to get as much machinery as possible on to the scow. In fact, in one or two instances, additional scows have had to be called into service to float the machinery.

The old clam-shell seems to keep right on at its work, and needs few repairs, while more complicated machines are half the time in the machinist's hands. Inventors who have improved dredging appliances until they are so expensive to build and run that they are laid aside or ignored will do well to recognize the fact that simplicity in this bulky class of machinery is a most important factor. We have heard of no private dredgers of any style, which have accomplished its work as cheap as that done by the Harbor Commissioners. The tugs, dredgers, barges, etc., of the State appear to be kept in first-class order. They are always steadily at work winter and summer. The mud, though soft, has to be carried some distance. It is lifted from the elips between the wharves, deposited in the scows, which are carried by the tugs to the deep waters of the bay channel. This is kept up steadily, the mud being moved from the shoal places at the wharves to the ship channel. The advisability of this action is to be questioned, but, as yet, no effective means have been devised to lift the mud from scows and deposit it on land. When this can be done at a reasonable figure, it will of course be time to stop dumping mud in our ship channel. The swift current of the bay distributes the mud evenly, and the area is so large that, as yet, no bad effect has been experienced.

Whatever the means have been to accomplish the result of cheap dredging in this bay, our Commissioners should be complimented by the public on their success.

The entire controversy between the Iron silver mining company of Leadville and the owners of the claim on Iron hill was settled Saturday by a judgment in favor of the Iron company and by a compromise. In the case of the Iron mine against the Tucson, judgment was entered in the United States Court in favor of the Iron. In the case of the Iron mine against the Luella, which is now pending in the United States Supreme Court, a stipulation was made of confession of error, which will likely make the decision of that Court in favor of the Iron mine. In addition, the owners of the Luella and Tucson mines have made conveyances of their entire claim to the Iron company.

CON. VIRGINIA produced 1,161 tons of ore last week assaying \$16.25.

The Mining Counties.

There is bright promise of an industrial revival in the mining counties east of San Joaquin valley. The mining interest in Calaveras has been slowly advancing for several years, and the prospect to-day is more encouraging than at any time since the exodus of miners resulting from the general suspension of work in shallow placer diggings. During the past year many rich quartz veins have been discovered, and costly improvements have been made in many localities in the way of erecting the necessary buildings and machinery for operating the mines successfully. The quartz mining interest, however, is not by any means the only one exhibiting renewed vitality. Hydraulic mining is reviving, and the approaching winter promises encouraging results. The principal field of operation in hydraulic mining is confined within narrow limits. It is mainly along Chile gulch, extending only a few miles from Mokelumne Hill in a southerly direction. What are known as Chile hill, Stockton hill and Red hill, all in proximity to each other, embrace the principal hydraulic mines, although there are several in other sections of the county that are likely to prove bonanzas to their owners. There are large interests in the central and southern portions of the county, where considerable amounts of gold will doubtless be obtained during the winter months when the supply of water is abundant. In the neighborhoods of Calaveritas, Fourth Crossing, San Antonio, Dogtown, Angels, Albany Flat, Vallecito, Douglas and Murphys, placer mining is still pursued with profit to industrious men; but in the course of a few years quartz mining will in all probability transcend all other industrial pursuits in Calaveras. Fruit raising and farming are yearly growing in importance. For many years stock raising has been followed in a small but profitable way. Calaveras contains vast areas of good wheat land, but the cost of transportation will be likely to prevent anything like extensive ventures in that direction for years to come.

Calaveras and Tuolumne counties have produced some of the best fruit that has found its way to market in the populated centers of the State. In no State in the Union, or, perhaps, no country in the world, can the excellence of the pears produced in the orchards near Columbia and Sonora be surpassed. Fruit raising is an industry which is yet in its infancy in mining counties. In future years old Tuolumne will, in all probability, realize a greater annual revenue from her orchards than she has even done from her gold mines. With fruit growing, stock raising, quartz and placer mining, and farming on as large a scale as the situation and capacity of the soil will permit, the prediction that the prosperous days of old Tuolumne are yet to come, is one not unlikely to be verified before the children now attending the mountain schools become men and women.—*Stockton Independent*.

Silver Reef District.

Sufficient developments have been made in our mines, and ample time has elapsed since their discovery, we would think, to demonstrate to the most sceptical that our ore bodies are lasting and go to the deep; and still a state of semi-indifference seems to be apparent among our mining men and men of means in availing themselves of the rare opportunities presented for investment. While we have been modest in our pretensions, not desiring to heggle the public with the threadbare cry of "boom!" in every issue of the paper, we still have referred with pride to our weekly and monthly bullion shipments, and it is a doubt in our mind whether there is another silver district in the world where, with the same number of miners employed and of equal stamp capacity, such uniform and gratifying results have been or are now being attained. And with these accomplished facts before us, it is but natural to anticipate the great wealth that is yet to be revealed to those who have the energy and means to avail themselves of the opportunities here presented.

Take, for instance, the small area of ground being worked—and all is being worked that has as yet received any energetic development—and compare it with the undeveloped portion of the district in our immediate vicinity, and it is plain to be seen that it would be difficult in the extreme to over-estimate the future should we desire to do so. Within a radius of one mile there are scores of mineral locations, very many, if not all, of which are as likely to turn out rich-producing mines as those which are now returning their owners handsome profits regularly in the shape of dividends.

These advantages appear the more marked while contrasting our own prosperity with the condition of affairs in our less fortunate neighboring camps, all, or nearly all of which are suffering from the relapse caused by, over-coloring and untrustworthy representations, made by goggle-eyed experts and whisky-guzzling correspondents, in the wake of whom lie blasted hopes, ruined confidence, and the wreck of incorporations.

The recent developments in the several mines are alike gratifying to us all, proving as they do the stability and permanence of our mineral deposits, and nothing short of stupidity or mismanagement on the part of investors can prevent them from reaching the highest measure of success.—*Silver Reef Miner*.

The Little Chief and other mines at Leadville, Colorado, owing to fires in them, have been ordered to suspend work temporarily.

Mining Boarding Houses.

Complaints begin to come in from every mining camp around Salt Lake, of a custom that has lately grown up among mining Superintendents of compelling married men to board, and in several instances, sleep at the companies' boarding houses. A mining Superintendent who discharges a miner for living with his wife and children is very foolish. Because if not a fool, he should know that a miner who would willingly hoard away from his home and little ones and partake of the Chinese-cooked slops of the average "company" boarding house, is not worth the powder required to blow him into eternity. Knowing this, and still insisting on drumming up trade for the companies' boarding house, he must have a pecuniary interest in the proceeds. There is no other way to look at this thing. There are times when mining companies find it necessary to build boarding and sleeping houses for their men. But in all such cases there is no other accommodation to be had and the mine owners supply the men with food and lodging close to their work. The miners pay well for this accommodation, and are therefore under no obligations whatsoever. But a miner saves a few dollars and brings his family from the East or from across the ocean; he builds himself a little house close to the mine and is happy in the thought that when his day's work is over, he can sit at his own fireside, surrounded by the little ones, from whom he has been so long separated. His wife prepares the supper, cooking only the dishes she knows he likes best. After supper, his pipe lighted and his children at his knee, he forgets how hard and steadily he had to swing the hammer or the pick, the whole day long, in the happiness his well-earned money has brought to those loved ones around him.

Hard, indeed, must be his heart who would break up that happy circle. But the mining foreman is the god with a small, a very small g, who steps in and says: "Here the company has a boarding house and you must board there or quit the job. We can get men any day, and if you don't like our style of doing business, you may hunt elsewhere for work."

The poor miner looks about him and sees his family happy around the glowing hearth and then thinks of the Chinese cook and the hurriedly-prepared hash on fly-specked plates and he asks: "Have I not given satisfaction by my work? Have I not worked faithfully 10 hours a day and performed my task to your satisfaction?"

"Yes, that's all right. I don't find fault with your work, but you must board at the company's boarding house or quit; that's all."

Yes, that's all. And that miner is compelled to pay out of his scanty earnings \$1 per day for his own board, besides buying provisions and fuel for his family.

If miners will forward the names of Superintendents or foremen who run mines and boarding houses on the above plan, we will publish their names with pleasure.—*Salt Lake Tribune*.

LOW WATER.—The mountain rivers are now quite low, and because of the suspension of hydraulic mining in most of the claims, particularly on Bear river and its tributaries, the water is more clear in the streams than it has been seen in years. Bear river presents but a thin stream of water of a faint yellow color, that carries but little of the obnoxious debris, and where seen running over ripples actually shows "white caps," something very unusual to be seen in that turbid stream in years. Greenhorn, one of the Bear river tributaries, has dwindled down to a stream that can be jumped across, with the water having but just a suspicion of slickens in it. The South Yuba continues to run a considerable body of water, as the large hydraulic claims on the ridge, owing to the reserves of water held back in the reservoirs, are enabled to continue washing up to this time, but yet the volume of the stream is down to a low summer stage. The low water and the long continuance of dry weather, is serving a double purpose, in running but little debris to the valleys, and enabling the work upon the dams of the lower Yuba and Bear rivers to be pushed forward to successful completion before the advent of the rainy season. By the completion of these dams, according to the plans of the State Engineer, the coming winter will furnish a good test of their utility in holding back the debris, and demonstrate as to their value in helping to solve a vexed and troublesome question.—*Grass Valley Union*.

PREPARING FOR WINTER.—Snow falls to the depth of from 15 to 30 ft. in Jim Crow canyon, Sierra county. The boarding house of the Black Jack mining company is located at the brow of the hill, and a tunnel is being run that starts into the precipitous bluff over 400 ft. down toward the bottom of the gorge. It would be almost certain death for the miners to attempt to go back and forth on top of the snow from the boarding house to their work, for at any time an avalanche is likely to sweep down the hillside, snapping off the trees that stand in its way like pipe-stems and burying 100 ft. deep any living creature that may be carried along. As a safeguard, Superintendent Young is having a strong snow-shed built from the mouth of the tunnel up to within about 80 ft. of the boarding house, and terminating at another tunnel from which a shaft opens to the brow of the hill. Thus the employees can travel between the two points during the heaviest snow storms without inconvenience or danger.—*Nevada County Transcript*.

Winter Prospects at Bodie.

The *Bodie Free Press* says: We have taken some care during the past week or 10 days to inquire into the business prospects of Bodie for the coming winter, and find good reason to be encouraged, if not elated, at the outlook. The business of the town is in exact proportion to the activity and amount of work being done in the mines. Probably all, or nearly all the mines which will not run through the winter, have already closed down. These do not embrace any which have employed large numbers of men. The Syndicate, Bechtel, Standard, Tioga, Blackhawk, Bodie, Belvidere, Jupiter, South Bulwer, Champion, Addenda, Oro, the Noondays, Red Cloud, University, Goodshaw, Boston Con., Last Chance, South Bodie, Glyn-Dale, and probably Dudley and others, will work through till spring. In the mines which are merely prospecting, the working force has already been cut down as low as possible, so that no further reduction may be expected in that quarter. Every stamp in the district, comprising the 30 of the Noonday, 10 of the Spaulding, 20 of the Standard, 30 of the Standard-Bulwer, 20 of the Syndicate, 10 of the Bodie, and 4 at the Miners—124 in all—is at work and will continue to be supplied without a doubt until spring. The new Silver Hill mill of 10 stamps is expected to be completed and at work within two months, and the Noonday will have 10 additional stamps. The mills of themselves keep large numbers of men at work.

We do not think that the pay-rolls of the district will average less than \$200,000 per month throughout the winter. The fact that large numbers of unemployed men are leaving and have left the camp, cannot be considered in any other than a favorable light, so far as it relates to the commercial prosperity of the place. Men without resources are necessarily a burden to those who have employment. The closing of a few restaurants and small business places, where expenses are not being paid, can't do much harm, and the sooner we settle down to a proper number of business houses, dry goods stores, hotels, newspapers, saloons, restaurants, etc., the better it will be for those who quit and those who remain.

We do not think, however, that business will be any duller than it is now, and the chances—which are dependent upon a development in the mines—are in favor of greater activity. Our advice to the people of Bodie is to keep a stiff upper lip, live within your income, don't whine because you have lost a few dollars in stocks, which the chances are you have made here, work right along as though nothing had happened, and be sure that this will be a good business place for many years to come.

Esmeralda District.

The *Free Press* has heard from what it believes to be a reliable source, that developments have been made and negotiations are pending, which are likely to make Aurora a booming camp, if not this winter at least in the early spring. The recent sale to Seth and Dan Cook can be regarded as a most auspicious event for our neighboring district. Those gentlemen have had a wonderful degree of success in their mining investments of late years equalled by no other capitalists on the coast unless it be Haggin & Tevis. They are the principal owners in the Standard Con., the best gold mine to-day in the world, and have other fine properties in different sections of the country. Their success must of course be attributed to the good judgment which they exercise in the selection of properties. There are rumors current that since they have come in possession of the Prospect mine they have been drifting on a live-ft. seam of the ledge which will average \$200 or \$300 per ton. This is at a depth of less than 50 ft.; and should this rich body of ore continue for any great distance in length, and be found to go down, the property, which is now a magnificent prospect, will become a splendid mine. The past history of Aurora, which has a record of bullion production in the millions, all taken from within 100 ft. of the surface, is such as to justify the most sanguine expectations respecting its future. The Real del Monte has heretofore had the entire burden of prospecting, but is now receiving aid at different points in the district. The Centennial, Grand Trunk, Eva, Northern Belle, Humboldt and Humboldt West and other prominent mines are now showing up immense quantities of ore, some very high grade. The time will come when 500 stamps will not be too many to crush the paying ore from Aurora mines.

A DESERTED QUARTER.—The north end of Main street is growing more deserted and dreary every day. At one time—three years ago—that section was the flourishing part of Bodie, but the town has moved up and left it demoralized. The signs "for rent" or "for sale" are frequent, and the houses are falling into decay. What were one time handsome saloons are now old rookeries, covered with cobwebs, dust and gloom. Mining camps go up a canyon invariably, and this is one reason why the north end is now so deserted and uninviting. At the present time the lean and hungry coyote can wander through the back yards without molestation, and the tarantula and bat dance to their favorite music in the lonesome rooms. When Bodie booms again all these things will change, and the hand of prosperity will touch that "north end" and make it flourish like a family of white mice.—*Bodie Free Press*.

Mining Facts.

If mine owners and those interested indirectly in mining matters would remember that if they tell newspaper men only one-half truth and the rest lies, their properties cannot be truthfully represented in this paper. Writing up mining matters is something like handling a prickly pear, ticklish business on all sides. A reporter meets a mine owner just in from his mine. "How is everything going. Does the Flahool ledge hold out?" "The mine never looked better. We have 10 ft. of clean \$60-ore in the face, and getting bigger and richer every day we work on it."

This is important news, and a note is made of the item. An hour afterwards a miner taps the reporter and asks: "Did you hear the news? The Flahool vein pinched out and all hands quit work yesterday, and are holding the whim and buildings for our month's back pay."

Now, the skirmishing commences. Who told the truth, the miner or the owner? After a few hours tramping and searching, and prowling and inquiring, and, need it be said, praying, that miner owner is found playing stud-horse poker in some back room where no one but the grace of God and a reporter could discover. "There's that d—n reporter again. Well, see here, things are kind of mixed up there on the mine, but I want to keep the thing out of the papers. Won't you have a cigar?"

"But," the reporter replies, "what did you tell me a lie for? Why not tell the whole truth? The paper would be in a pretty fix stating a mine booming that had pinched out, and was attached by the miners for their wages."

"We will let it go." The great trouble with mining men is they think the bigger they try to make their mines appear on paper the better for them. This is a mistake. If a vein is a foot wide, no statement made in the papers can make it any wider. There should be a law regulating the manner of killing a liar, and if the *Tribune* had any voice in the matter, the punishment of a mining liar would be a trip through a Stedefeldt furnace.

Then there is the modest mine owner who wants to keep the facts from the public. He wishes to be let severely alone. Now, it is just as bad to understate a mine as to overstate facts, and that's the kind of modesty that has kept our reporter poor for years. He owns good mines, but he is too modest to lay the facts before the world.—*Salt Lake Tribune*.

Mineral and Agricultural Land.

The following circular relative to selection of agricultural lands or lands returned to Registers and Receivers by the Surveyor-General, as mineral, has been issued by the Commissioner of the General Land Office:

Registers and Receivers, U. S. D. L. Offices.—GENTLEMEN: Hereafter, in case of application being made in your office to enter or select as agricultural lands under act of Congress other than the pre-emption or homestead acts, lands returned as mineral by the Surveyor-General, you will require the applicant, at date of final proof of location or selection, to publish for 30 days a notice describing the land applied for, and giving time and place when such proof will be submitted or selection tendered. You will also put in your office a copy of the notice for the same period. Proof of the publication will consist of the affidavit of the publisher of the newspaper in which the notice was published, and you will furnish your own certificate as to posting in your office. The revocation of the withdrawals of lands as mineral by circular of April 27, 1880, was made, not only because said withdrawals had in many instances worked great hardship to settlers, but because it is required by law that homestead and pre-emption claimants shall publish notices of their intentions to make final proof on their entries, and this was thought to afford sufficient protection to all parties; but in case of entries under other laws, there is no such notice required. This precedence will apply to cases of application to enter under the townsite, desert land and timber culture laws; applications to select lands under grants to States, railroad and wagon road companies, and the location of the various classes of scrip upon lands which have been returned by the Surveyor General as mineral in character whereafter such publication of notice has been regularly made, no affidavits alleging the mineral character of the land having been filed with you, you will allow the entry, selection or location upon the filing of a proper non-mineral affidavit. If such mineral affidavit shall have been filed, you will proceed with a hearing as directed by the circular of April 27, 1880.

Very respectfully,

J. M. WILLIAMSON, Comr.

ASBESTOS POWDER.—Asbestos powder, made into a thick paste with liquid silicate of soda, is used with great advantage for making joints, fitting taps and connecting pipes, filling cracks, etc. It hardens very quickly, stands any heat and is steam tight.

The use of iron sleepers is becoming general in Germany. The Berg-Mark railway exchanges all the old worn out wooden sleepers for iron ones. Tenders were lately received by the Royal Prussian Railway Board for nearly 5,000 tons of iron sleepers.

A solid chunk of gold, oval in shape, weighing 66 ounces, and worth 1,200, was found in a tunnel at Sucker Flat, Placer county, a few days since.

MECHANICAL PROGRESS.

Welding Broken Spring Plates.

In our issue of October 2d, we gave some directions from the London *Coachmakers' Journal* for welding broken spring plates. A correspondent of the *Blacksmith and Wheelwright* gives his plan, which he considers "decidedly more practical." He says: "I first heat, upset and scarf the broken ends of the 'plate' (leaf we generally call it), just as if it were iron, and to be welded by separate sand heats; then place them in a clean fire and take separate box heats; heat as high as the safety of the steel will permit. I then let my helper take out one end while I take out the other, and when 'stuck' come on to it lively with the sledge, and nine times out of ten I get a good sound weld at the first heat. Care must be taken to leave it as 'heavy' at the weld as the original size of the steel.

The loss of length can generally be made good—if a "hed leaf"—by letting out, or taking up (as the case requires) the scroll at the end of the bottom "hed leaf," or, if it is an outside or intermediate leaf, the little loss in length is of no importance.

Now the welded end of the "leaf" must be tempered—a spring temper—or, no matter how perfect the weld, it will not prove a good job. Tempering properly is the most important feature of the job, and the fact that the majority of smiths overlook it altogether is the reason that our patrons have universally come to say:

"A spring that is once broken is never much account after; I'd much rather pay for a new leaf, if you can make one, than be bothered with it."

Since I have learned through my own observation the importance of tempering, I seldom weld a spring which fails to stand as well as its fellows.

Glass as a Building Material.

We lately entertained our readers about ties of tempered glass for railroads, obtained by Siemens's method. A new application of this method has been pointed out to us which would have appeared incredible at the time when glass was only known in its primitive condition as a crystalline product, with sharp, broken edges, yet fragile and unresisting to shocks and pressure. Tempered glass can be obtained in great pieces, gifted with a power of resistance which its specific lightness, compared with heavy metals, would not have given the least presumption. It can now be employed, notably in carpentry, for posts, joists, ties and buttresses. It combines the advantages of strength and of incorruptibility in contact with all atmospheric agents, as well as with chemical factors, and consequently, is of perpetual duration. Besides these advantages, another is the smallness of the price of acquisition. This material is now as cheap as iron of the same weight, and as a large sale is counted on, it will not be long before the reduction of price will be below the cost of wood. No doubt many industries will profit from this new progress in the fabrication of glass, and it will be greatly appreciated in the household. One will see the time when the metals and wood will be replaced by glass in a great number of implements, utensils, and objects of diverse nature, such as stop-cocks, gutter-spouts, buckets, and even barrels.—*Manufacturer and Builder*.

LONG RUN WITHOUT REPAIRS.—Passenger engine No. 273, on the Pennsylvania road, was built at the Altoona shops and turned out on the road in 1875, with Mr. Sol. Hoffmeister as engineer. She weighs 75,500 lbs., and has five-ft. driving wheels. About nine weeks ago the engine was placed, for the first time, in the shop for repairs, having been in continual use 49 months, and in that time has run 251,552 miles, and is now in the Middle Division round house ready for the road once more, looking as good as new. Mr. Hoffmeister has the credit for all the mileage made by the engine in the past four years, and the wonderful amount of work performed by it speaks well for the care he has displayed of the machine, as well as the excellent workmanship of the machinists and other workmen engaged in the construction of locomotives.—*Pittsburg Telegraph*, Oct. 29th.

AN IMPROVED PROPELLER.—An invention which is attracting considerable attention among shipbuilders in England is the De Bay propeller, which, there is every ground for believing, will considerably reduce the enormous waste of power of the screw now so generally adopted for the propulsion of steam vessels, although the loss of power is from 40% to 50%. The propeller consists of two screws, which are revolved in contrary directions. The two screws are mounted on shafts, of which the one revolves within the other, the one screw having three blades, while the other has four. These are of peculiar shape, being so formed that each blade has projections where the other has depressions. A steamer, the *Cora Maria*, was fitted with the propeller, and it was found that while she steamed 8.73 knots with an ordinary screw, her speed was 11.23 knots, a saving of 29.2%, with practically the same expenditure of power.—*Iron*.

Air Locomotive for Street Railroads.

English papers give an account of an air locomotive designed by Major Beaumont, of the Royal Engineers. From an account of an experiment made at Woolwich, some points may be gathered useful in subterranean street railroad communication in cities. The engine, having received a charge of 100 cubic ft. of air, with a pressure of 1,000 lbs. to the square inch, left the Royal Arsenal station, on Oct. 6th, at 12:22 p. m., for a run to Dartford and back, about 16 miles. In order to increase the energy of the air, it was heated, on being admitted to the cylinder, by a very small quantity of steam. The indications on the pressure-gauge, as different stations were passed, were 940 lbs. at 12:27 p. m.; 800 lbs. at 12:33; and 760 lbs.; 540 lbs. pressure being the store of energy on arriving at Dartford at 12:50. Wasto having been occasioned by shunting, the return journey began with a pressure of 510 lbs. at 1:35 p. m., and Plumstead station was again reached at 2:10. This locomotive, not so large as one of our common street cars, weighs about 10 tons, and draws a load of 16 tons up a moderate incline. It can be charged with air in 15 minutes, does not send out any rush of steam or noxious gases, and makes only a trifling noise. Its sanitary advantages for underground work are obvious, and it can also be used for surface roads. Major Beaumont calculates that one on this principle, but weighing about 50 tons, would be the most powerful of traction motors.

FIRE-RESISTING QUALITIES OF BUILDING STONE.—Doctor Cutting, State Geologist of Vermont, has concluded his unique series of tests on the fire-resisting qualities of building stones. He sums up the result in the current number of the *Weekly Underwriter*. He declares, in substance, that no known natural stone deserves the name fire-proof. Conglomerates and slates have "no capacity" of standing heat; granite is injured beyond cheap or easy repair by even so mild a heat as that which melts lead; sandstones, including the variety called brownstone in this city, are better, and limestones and marbles are perhaps the best in this respect. But even they are injured by continuous heat of 900°, and at 1,200° are changed into quicklime. Therefore, it would seem that no stone buildings are fire-proof, and some of them, Dr. Cutting even says, are as much damaged by fire as wooden structures are. Brick, on the contrary, is usually uninjured, and is often rather improved by heat until it is melted. But as most brick buildings are either trimmed with iron or stone, the damage is often considerable, even when the walls stand. To avoid this, Dr. Cutting recommends soapstone trimmings, which are open only to the objection of expense. But although brick stands heat so well, it is objectionable, because its power to resist pressure without crumbling from dampness or frost, is less than that of stone. Nevertheless, as brick is only a kind of artificial stone, the search for an ideal building material is not hopeless, but it must be prosecuted rather by the maker than by the quarrier of stone.

THE BOLLEE STEAM COACH.—A steam coach is attracting considerable attention in the streets of Berlin, where it has been extensively experimented with. It is built according to the system of Bollee, an engineer from Le Mans, France, and in its present shape is intended for passenger service only. It has but two pairs of wheels, of which the back pair are the driving wheels, while the front pair is under control of the driver. The boiler is one of the Field type, made of sheet copper, and capable of resisting a pressure of 150 lbs. per square inch. The boiler is mounted on a platform, upon which the engine proper is placed, and which the stoker occupies. The driver has an elevated position in front of the carriage, and the reversing levers, steering gear and throttle-valve lever are within easy reach of him. Between the two pairs of wheels is the body of the coach, capable of accommodating six passengers. It has been found by trial that this coach can make 12 miles per hour on good pavement, and 18 miles on an asphalt or macadamized road. Though the promoters of the enterprise appear to be sanguine of success, there seems little hope that even in Germany the steam coach will conquer a place in modern means of travel.

THE PHILOSOPHY OF WELDING.—If iron were similar to other bodies, and a blow or sudden pressure produced heat all through the mass, the unexpanded liquid at the surface, as well as the interior plastic iron already expanded, would rise in temperature, the consequence of which would be that the molecular conditions at the junctions would still differ, although both at a higher temperature, and, therefore, molecular union could not take place. But if the liquid iron at the surface of the weld is in that condition of temperature that it would cool by pressure, the result is different, as the blow or pressure acts on the plastic iron to produce heat, and on the surface iron—which is on the border-land between liquidity and plasticity—to produce cold; consequently there is a moment when the temperatures of the two would meet each other and render the molecular condition of the junction uniform and continuous. This appears to be a satisfactory explanation of the wonderful property of welding iron, and its counterpart in ice is the interesting phenomenon of regelation." *L'Ingenieur*.

SCIENTIFIC PROGRESS.

Something New About the Formation of Dew.

We are all familiar with the bright, transparent beads of water formed upon grass and other kinds of vegetation during the clear and still nights of summer and autumn. This water is known as "dew," and the generally received theory of its formation was first clearly set forth by Dr. W. C. Wells, a physician of London, in his famous "Essay on Dew" first published in 1814. This essay still continues to be the standard authority on the subject, and, so far as the writer is aware, nothing further new or of special interest in this connection has found its way into any standard publication up to the present time.

Dr. Wells's theory, as is well known, sets forth that dew is a deposit of invisible moisture from the atmosphere upon the surfaces, the temperature of which is lower than that of the surrounding atmosphere. The deposit formed in a warm day upon the outer surface of a pitcher of cold water is due to the same law. But now comes Mr. J. U. Lloyd, with a series of articles in the *Christian Standard*, of Cincinnati, commencing with July 24, 1880, in which he admits that the idea is beautiful and the theory true to a certain extent, but denies that all the moisture thus observed is derived from the atmosphere. He holds that there are two kinds of dew, derived from entirely unlike sources, and which, when separately collected, show entirely different chemical characteristics. The one, when deposited from a pure atmosphere, is almost pure water, while the other, although collected from vegetation exposed in the same field and to the same atmosphere as the first, contains so large an amount of sugar (glucose) as, in some instances, to be quite perceptible to the taste.

Mr. Lloyd says he had noticed that on certain species of grass, dew is found in the evening in drobs upon the tip end of each thrifty blade, before the remainder of the blade is moistened, and before there is moisture upon the surface generally of any vegetation in the vicinity; that these drops are continually falling off, from their accumulating weight, and are constantly being replaced by other drops at the same point. It was evident that these drops were not condensed from the atmosphere. He noticed that while one species first shows the drop upon the tip of the blade, others were covered with heads of moisture simultaneously along the entire edge of the blades, while still other herbs and leaves remain perfectly dry or exuded moisture from their entire surface. He asks, "can this variation be explained by any law of radiation?" and answers the question in the negative. He argues, both from observation and reason, that dew proper is deposited from the atmosphere, according to Dr. Wells's theory, but that the drops formed at the tips and edges of certain grass blades and leaves, as above, are exuded from the plants. The sugar found in such drops is the surplus of that which is formed in the upward passage of the fluid, and which, not being appropriated by the plant, goes to waste in solution with the exuded water. Hence the familiar fact that cattle prefer grass which is or has recently been, wet with dew (exuded moisture)—it is sweeter than that which is more dry.

The term, "honey dew," is frequently applied to a moisture which sometimes attracts bees and other insects by its peculiar sweetness. There seems to be a great difference in the amount of water exuded by different plants. "Blue grass" is especially noticeable for the rapid formation of drops on the tips of its leaves. The plant commonly known as the "Indian turnip," the large-leaved species of *Caladium*, or "Elephant's ear," etc., are also specially noticeable. He also holds that this excreted dew is greater in quantity than that which is condensed from the atmosphere.

The philosophy of this exudation may be condensed from one of the Doctor's papers, as follows: The rootlets of each clump of grass, or of each shrub or bush, are constantly absorbing from the earth water charged with such mineral ingredients as are needed for the growth of the plant, and the grass blades and leaves are continually exhaling the surplus water into the atmosphere. The cells of the plants seize upon the nutritive principles, appropriating them to their support and growth. The surplus, or depleted water, escapes, in the day time by insensible evaporation, but during the night, when but little or no evaporation takes place, this moisture accumulates upon the leaf surfaces, and becomes visible. In some plants it exudes mainly from a few comparatively large microscopic openings [in the tips of the leaves, as in blue grass; from others along the edges; from others still, evenly over the entire surface. The latter, for evident reasons, is more generally confined to wooded plants, with leaves and branches. These deductions, the Doctor avers, are the result of extended observations, sometimes carefully conducted with chloride of calcium and bell glasses, and by other means. The question here raised is certainly a very interesting one, and will no doubt be speedily confirmed or exploded. It is given in these columns for what it is worth, as an interesting item in the progress of scientific investigation.—*Californian* for December.

Dangers of the Electric Light.

Now that the electric light is coming into quite general use, it is proper that the public should be warned against the dangers incident to its use. Ladies who value their complexion should not approach an open light of any considerable power too closely, or expose themselves to it for any length of time, as the effect is very likely to be similar to that of walking for hours in a July sun. But a far more serious danger is that which comes from a careless handling of the wires by which the electricity is conveyed. Quite recently a man on board the steam yacht *Livadia* was asked to support an electric lamp temporarily while arrangements were being completed for hoisting it to its position, and by mistake placed his hand in such a position as to divert the current from the candle through his body. He was killed instantaneously.

Another source of danger has been found in the liability of a contact of wires by which a powerful light current may be suddenly transferred to a telegraph or telephone circuit, as recently occurred in New York, in consequence of which a telephone instrument and its surroundings were suddenly set on fire, to the great danger of the entire building and its contents.

DIGESTION IN CERTAIN PLANTS.—Dr. Lawson Tait has recently investigated afresh the digestive principle of plants. While he has obtained complete proof of a digestive process in cephalotus, nepenthes, dionaea and the droseraceae, he entirely failed with *sarracenia* and *darlingtonia*. The fluid separated from the droseraceae he found to contain two substances, to which he gives the names "droserin" and "azarin." Dr. Tait confirms Sir J. D. Hooker's statement that the fluid removed from the living pitcher of nepenthes into a glass vessel does not digest. A series of experiments led him to the conclusion that the acid must resemble lactic acid, at least in its properties. The glands in the pitcher of nepenthes he states to be quite analogous to the peptic follicles of the human stomach; and when the process of digestion is conducted with albumen, the products are exactly the same as when pepsin is engaged. The results give the same reactions with reagents, especially the characteristic violet with oxide of copper and potash, and there can be no doubt that they are pepsin.

TRANSFORMING SOUND INTO LIGHT.—M. Treve has described to the French Academy of Sciences an experiment with an apparatus which he calls a singing condenser, by which he believes he effects the transformation of sound into light. When a current of electricity is brought to bear upon his condenser a sound is produced, which he attributes to the vibrations of the air in the condenser, produced by the shock of the electric current. Reversing this experiment, he placed the condenser in a Geissler tube, and brought the two poles of the electric current to bear upon the condenser through the electrodes of the tube. The tube was then connected with an air-pump. The condenser sounded as usual when the current was directed to it under the ordinary atmospheric pressure; but when the air was withdrawn the sound became more and more feeble, until, as a vacuum was produced, it ceased entirely, and a clear, bright light appeared, sparkling like pearls, from the leaves of the condenser, quite unlike the ordinary pale, vague light of the Geissler tubes.—*Californian* for December.

COPPER IN PLANTS.—It has generally been held that metallic substances impregnating the soil were not absorbed by plants; that the roots possessed a species of selective power in virtue of which they rejected everything of an injurious nature. This is not strictly true, since there are exceptions to the rule. The ashes of a species of violet (*Viola calaminaria*), which flourishes on the waste or heaps of certain of the zinc mines of Rhein Prussia, have been found to contain considerable quantities of zinc. Mr. Dieulafoy, a noted French mineralogist, now adds his testimony to the inaccuracy of this opinion, by proving the presence of copper in plants which grow on rocks belonging to the copper-bearing series. In some instances he was able to obtain a distinct reaction for copper with ammonia in one grain of ash. It is not improbable that investigation would disclose the fact that other metals are also taken up by plants.

OZONE IN THE ATMOSPHERE.—Hert E. Schone contends that the presence of ozone in the atmosphere is by no means proven, although it has been shown that hydrogen dioxide is in the air. Iodine potassium paper is entirely unfit for use in determining the presence of ozone, as its coloring is dependent upon the moisture in the air. Thallium paper is not thus influenced. It is prepared by pouring a solution of sulphate of thallium into a boiling solution of barium hydroxide. The solution of thallium thus obtained is used to soak filter paper. According to Schone's investigation the intensity of the coloring of this paper by the formation of a brown oxide has corresponded with the percentage of hydrogen dioxide in the air.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Nov. 4.	Week Ending Nov. 11.	Week Ending Nov. 18.	Week Ending Nov. 25.
Alpha.....	4 23.45	2 4 3 24	2.20	
Alta.....	42 2.70 4.10	3.60 64 6 54	4.15	
Andes.....	90c 80c 90c	80c 1.15 95c 90c	80c	
Argenta.....	30c 20c 30c	30c 30c 25c 25c		
Atlantic.....	.....	.....	.....	.....
Aurora Tunnel.....	.....	.....	.....	.....
Baltimore Con.....	2.20 1.80 1.90	1.2 2.1 1.70 1.1	1.95c	
Belmont.....	.....	.....	.....	.....
Best & Belcher.....	10 81 91 73 104	88 81 8		
Bullion.....	2.95 1.70 2.20	1.70 2.05 1.60 1.20		
Bechtel.....	1.30 1.15 1.35	1.30 1.50 1.75	1.50	
Bodie.....	55c 55c 50c	80c 65c 75c 50c		
Bodie & N. Co.....	4 3.80 4 4	4 4 5 4.30		
Benton.....	1.65 70c 1.40	1.20 1.80 1.20 1.15	95c	
Buwalda.....	.....	.....	1.15 1.10	
Black Hawk.....	.....	.....	.....	.....
Beveland.....	45c 40c 10c	10c 35c		
Booker.....	150 10c 15c	10c 10c 5c 5c		
Oatland.....	45c 35c 40c	25c 40c 30c 30c	20c	
California.....	2.05 2.30 2 1.80 1.90	2 1.70 34 4.0 1.45		
Challenger.....	2 75c 80c	60c 90c 75c 70c		
Chollar.....	2.40 2.05 2.15	1.70 2 1.80 1.2 1.1		
Confidence.....	3.70 3.60 3.4	3.4 3.65 3.60 3		
Con Imperial.....	2.80 2.65 2.85	2.80 2.6 2.30 2.20		
Con Virginia.....	1.1 1.05 1.1	1 1.2 1.15 1.30	1	
Crown Point.....	.....	.....	.....	.....
Oon Washoe.....	.....	.....	.....	.....
Champion.....	.....	.....	.....	.....
Concordia.....	1.1 1.10 1.05	90c 1 1		
Dayton.....	.....	.....	.....	.....
DeFrees.....	.....	.....	.....	.....
Danay.....	.....	.....	.....	.....
Day.....	25c 20c 35c 20c 25c 20c			
Eureka Con.....	1.20 1 1.60	80c 1.90 1.1 1.05		
Excelsior.....	.....	.....	.....	.....
Endowment.....	.....	.....	.....	.....
Gen Thomas.....	2 1.60 1.85	1.55 1.65 1.1 1.65		
Golden Prize.....	.....	.....	.....	.....
Golden Chariot.....	.....	.....	.....	.....
Golden Terra.....	.....	.....	.....	.....
Goodshaw.....	55c 20c 1.60	65c 95c 80c 75c		
Good & Curry.....	3.50 3.30 3.50	3.50 4.60 3.50 1.50		
Hale & Norcross.....	3.35 3.25 3.60	3.40 3.40 3.40 3.40		
Hillside.....	.....	.....	.....	.....
Highridge.....	.....	.....	.....	.....
Homestake.....	.....	.....	.....	.....
Hussey.....	.....	.....	.....	.....
Independence.....	.....	.....	.....	.....
Julia.....	55c 40c 50c	40c 55c 40c 40c	25c	
Justico.....	1.05 70c 1	80c 2.05 1.1 1.60	1.10	
Kentucky.....	.....	.....	.....	.....
Kentuck.....	1.1 1.1 1.1	1.20 1.60 1.1 1		
Kosuth.....	.....	.....	.....	.....
Keystone.....	.....	.....	.....	.....
Lady Bryan.....	.....	.....	.....	.....
Lady Wash.....	35c 25c 30c	20c 40c 30c 25c	15c	
Leopard.....	.....	.....	.....	.....
Leviathan.....	.....	.....	.....	.....
Leeds.....	.....	.....	.....	.....
Martin White.....	.....	.....	.....	.....
May Belle.....	.....	.....	.....	.....
Modes.....	.....	.....	.....	.....
Manhattan.....	.....	.....	.....	.....
McIntosh.....	.....	.....	.....	.....
Meadow Valley.....	.....	.....	.....	.....
Mexican.....	81 7 7 6 8 7 7 6 3			
Mides.....	.....	.....	.....	.....
Moning Star.....	.....	.....	.....	.....
North Con Virginia.....	.....	.....	.....	.....
New York.....	10c 5c 15c	5c 40c 30c 30c 20c		
Northern Belle.....	.....	.....	.....	.....
New Oso.....	.....	.....	.....	.....
Nevada.....	1.10 75c 1.10	75c 1.20 81 1.10		
Northern Belle.....	1 95c 1.10	1 1.1 1.20 1.1		
Opbir.....	72 61 74	62 7 6 62 51		
Oriental.....	.....	.....	.....	.....
Overman.....	1.15 95c 1.05	70c 1.1 90c 90c 75c		
Panther.....	.....	.....	.....	.....
Phenix.....	.....	.....	.....	.....
Phil Sheridan.....	.....	.....	.....	.....
Potosi.....	2.10 1.80 1.90	1.65 2.10 1.80 1.2 1.60		
Prospect.....	.....	.....	.....	.....
Raymond & Ely.....	.....	.....	.....	.....
Rioer.....	.....	.....	.....	.....
Rook Island.....	.....	.....	.....	.....
Rye Patch.....	.....	.....	.....	.....
Rough & Ready.....	.....	.....	.....	.....
Savage.....	2.15 1 2.35	1.90 2.60 2.10 2.05 1.2		
Seg Belcher.....	.....	.....	.....	.....
Sierra Nevada.....	82 7 7 6 9 7 8 7 4			
Silver Hill.....	50c 40c 60c	35c 75c 40c 40c 25c		
Silver King.....	.....	.....	.....	.....
Silver Prize.....	.....	.....	.....	.....
Sinclair.....	.....	.....	.....	.....
Summit.....	.....	.....	.....	.....
Swamp Angel.....	1.30 1 1.20	1.1 1.15 1.1 1.10		
South Standard.....	.....	.....	.....	.....
St. Louis.....	.....	.....	.....	.....
St. Paul.....	.....	.....	.....	.....
Syndicate.....	.....	.....	.....	.....
Toga Con.....	40c 40c 50c	50c 50c 25c 50c 40c		
Tiptop.....	.....	.....	.....	.....
Trojan.....	.....	.....	.....	.....
Union Con.....	1.1 1.0 1.0	81 1.4 1.0 1.1 1.0		
Utah.....	72 62 7	52 7 6 62 51		
Vermont Con.....	.....	.....	.....	.....
Ward.....	.....	.....	.....	.....
Wells.....	.....	.....	.....	.....
Woodville.....	.....	.....	.....	.....
White Cloud.....	.....	.....	.....	.....
Yellow Jacket.....	3.80 3 4.45	3.95 4.2 3.80 3.90 2.90		

Sales at S. F. Stock Exchange.

Wedday A.M., Nov. 24.	380 Sierra Nevada.....	77 27 2
100 Alpha.....	510 Savage.....	104 27 2
715 Alta.....	660 Union.....	104 27 2
120 Andes.....	.....	.....
300 B & Belcher.....	60 Yellow Jacket.....	104 27 2
200 Belcher.....	.....	.....
1500 Benton.....	25 Boston.....	1.10
100 Bullion.....	50 Buwalda.....	1.10
500 Brilliant.....	100 California.....	1.10
250 California.....	1.15	
250 Chollar.....	20 Champion.....	20c
250 Con Virginia.....	100 Con Pacific.....	75 27 2
140 Crown Point.....	160 Columbian.....	2.20
150 Con Imperial.....	100 Con Nevada.....	1.10
950 O Dorado.....	150 Eureka Con.....	1.10
100 Oaledonia.....	150 Grand Prize.....	1.15
220 Excelsior.....	170 Goodshaw.....	1.05
200 Gould & Curry.....	10 Mono.....	1.40
1220 Hale & Nor.....	300 Mt Diablo.....	1.40
1310 Justico.....	50 N Noonday.....	1.10
750 Julia.....	50 Noonday.....	1.10
20 Kentucky.....	100 Northern Belle.....	1.10
100 Morning Star.....	70 Nevada.....	1.10
250 Mexican.....	275 Star.....	20 25c
150 New York.....	100 Syndicate.....	1.10
150 Occidental.....	250 Silver King.....	1.10
270 Opbir.....	100 Toga Con.....	1.10
750 Overman.....	100 Tiptop.....	1.10
170 Potosi.....	100 Tuscarora.....	1.10
510 Scorpion.....	110 61 15	15c

The Silver Reef Miner, of Utah, says: The problem of how to successfully work the hundreds of thousands of tons of low grade ores which are exposed and known to exist in this district, is, we are happy to state, probably approaching a solution. Already the attention of capital is being directed to this question, and it may not be long before the desideratum so devoutly wished for by the numerous owners of low grade mines will be an accomplished

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co	Nevada	13	1 00	Oct 27	Nov 30	Dec 21	Wm Willis 309 Montgomery st
Belcher S M Co	Nevada	25	75	Nov 3	Dec 6	Dec 27	J H Crockett 327 Pine st
Black Hawk G M Co	Cal	10	10	Nov 3	Dec 15	Jan 7	H A Charles 419 California st
Benton Con M Co	Nev	4	50	Oct 27	Nov 30	Dec 20	W Watson 302 Montgomery st
Best & Belcher M Co	Nev	19	50	Nov 6	Dec 10	Dec 31	Wm Willis 309 Montgomery st
Buckeye W & H M Co	Cal	3	2 00	Nov 4	Dec 11	Jan 4	W H Lowden 320 Sansome st
Champion M & M Co	Cal	8	25	Oct 4	Nov 9	Nov 30	John Crockett 327 Pine st
Caledonia M Co	Dakota	9	30	Oct 2	Nov 14	Dec 6	D F Verdenat 327 Pine st
Con Imperial M Co	Cal	13	10	Nov 3	Dec 8	Dec 29	W E Dean 309 Montgomery st
Crown Point G & S M Co	Nev	43	50	Oct 7	Nov 18	Dec 10	James Newlands 327 Pine st
Chollar M Co	Nev	5	50	Nov 9	Dec 14	Jan 4	W E Dean 309 Montgomery st
Excelsior M Co	Nevada	16	30	Oct 7	Nov 10	Nov 30	C E Elliott 327 Pine st
Silver & Norcross M Co	Nevada	56	36	Nov 4	Dec 2	Nov 30	W E Dean 309 Montgomery st
Jackson M Co	Nevada	13	20	Nov 23	Dec 27	Jan 17	C M Shaw 408 California st
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	Dec 10	O Van Dyke Hubbard 310 Pine st
Maryland Con G & S M Co	Cal	2	25	Aug 10	Sep 15	Dec 18	E P Farnsworth 202 Sansome st
Mackay M Co	Nevada	2	25	Nov 23	Dec 30	Jan 24	J M Euffington 309 Montgomery st
Mammoth M Co	Cal	6	25	Nov 3	Dec 6	Jan 3	A W Rose Jr 302 Montgomery st
Sierra Nevada M Co	Nevada	66	1 00	Nov 11	Dec 15	Jan 4	E L Parks 309 Montgomery st
Real Del Monte M Co	Nev	13	25	Nov 5	Dec 9	Jan 3	C Van Dyke Hubbard 310 Pine st
Mono G M Co	Cal	9	60	Oct 13	Nov 19	Dec 7	W H Lent 309 Montgomery st
New York M Co	Cal	24	15	Oct 11	Nov 13	Dec 3	D L Thomas 327 Pine st
Oroville Con G M Co	Cal	5	06	Oct 11	Nov 30	Dec 20	W T Smith 402 Montgomery st
Ophir S M Co	Nev	38	1 00	Nov 5	Dec 10	Dec 30	C L McCombs Nevada Block
Savage M Co	Nevada	44	1 00	Oct 4	Nov 5	Nov 26	E P Holmes 319 Montgomery st
Telluride M Co	Cal	12	10	Oct 17	Nov 17	Dec 14	J M Litchfield 415 Montgomery st
Telluride & S M Co	Cal	23	10	Oct 13	Nov 17	Dec 14	J M Litchfield 415 Montgomery st
Union Con S M Co	Cal	15	1 00	Nov 13	Dec 16	Jan 3	J M Euffington 309 California st
Utah S M Co	Nev	32	2 00	Nov 4	Dec 9	Dec 29	O Pratt 309 Montgomery st
Yellow Jacket M Co	Nev	39	1 00	Oct 5	Nov 10	Dec 8	Merced Otey Gold Hill Nevada

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Argentina M Co	Nevada	6	10	Nov 30	Dec 22	Jan 13	E M Hall 327 Pine st
Arizona Prospecting & M Co	Arizona	2	05	Oct 8	Dec 4	Dec 22	O E Travers 331 Montgomery st
Armand G & S M Co	Cal	2	02	Oct 21	Nov 30	Dec 20	J L Fields 240 Montgomery st
Belmont M Co	Cal	26	15	Oct 9	Nov 15	Dec 13	J W Pew 309 Pine st
Crown Point G S M Co	Cal	43	50	Oct 7	Nov 13	Dec 10	James Newlands 327 Pine st
California G M Co	Cal	10	10	Oct 6	Nov 30	Dec 10	E F Dean 309 Pine st
Chahorra M Co	Mexico	2	10	Oct 13	Nov 17	Dec 16	E B Holmes 309 Montgomery st
Commonwealth Con M Co	Cal	3	10	Oct 9	Nov 12	Dec 2	Chas A Morse 217 Sansome st
Cumherland G & S M Co	Arizona	2	30	Oct 27	Nov 30	Dec 24	J H Griffiths 328 Market st
Day S M Co	Nevada	7	15	Sep 22	Nov 25	Nov 22	J W Pew 310 Pine st
Excelsior G M Co	Nevada	13	10	Oct 20	Nov 24	Dec 15	D B Chisholm 327 Pine st
Eagle S M Co	Cal	15	10	Nov 15	Dec 15	Jan 15	J E Byrne 533 Kearny st
Iowa M Co	Nev	11	03	Oct 13	Nov 15	Dec 6	Wm Gillespie 411 1/2 California st
Lewis Con S M Co	Arizona	3	10	Oct 2	Dec 1	Dec 20	J W Pew 328 Montgomery st
Mac Cluer G M Co	Cal	6	45	Oct 10	Nov 21	Dec 31	E A Holmes 309 Pine st
Mt Potosi Con M Co	Nevada	6	25	Oct 12	Nov 15	Dec 6	E A Holmes 309 Pine st
Maryland Con G & S M Co	Cal	2	25	Aug 10	Nov 30	Dec 18	E P Farnsworth 202 Sansome st
Mono G M Co	Cal	9	50	Oct 13	Nov 19	Dec 9	W H Lent 309 Montgomery st
Oro M Co	Cal	6	10	Nov 15	Dec 18	Jan 13	Wm Stuart 320 Sansome st
Silver Hill M Co	Nevada	13	10	Oct 6	Nov 21	Dec 1	J M Euffington 309 Montgomery st
San Jose M Co	Nev	17	20	Oct 12	Nov 2	Dec 7	A Carrigan 108 Front st
Tuscarora M & M Co	Nevada	7	15	Oct 30	Dec 4	Dec 27	M E Sperling 309 California st
Wide Awake Prospecting M Co	Arizona	11	10	Oct 18	Nov 25	Dec 18	C Hildichand 222 Sutter st
Wyoming & Dakota W Co	Dakota	3	20	Oct 28	Dec 7	Jan 3	Theo Widman 404 Montgomery st
Windor M Co	Nev	1	07 1/2	Nov 17	Dec 22	Jan 17	C E Elliott 327 Pine st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Butte Creek Hydraulic M Co	Cal	R L Taylor	230 Pine st	Annual	Dec 6
California G M Co	Cal	Cor California	309 Montgomery st	Annual	Dec 7
Eastern Belle M Co	Nevada	O M O'Brien	309 Montgomery st	Annual	Dec 7
Gipsy Queen M Co	Cal	Ellis Edwards	320 Pine st	Annual	Dec 15
Swamp Angel G M Co	Cal	Ohas W Badger	315 California st	Annual	Dec 2

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	60	Sep 15
Golden Terra M Co	Cal	J K Goodrich	309 Montgomery st	25	Sep 21
Grand Prize M Co	Nevada	E M Hall	327 Pine st	25	Sep 8
Indian Queen M Co	Cal	Grove Adams	Merchants' Ex	10	Oct 25
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	10	Oct 30
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	Nov 15
Silver Hill M Co	Arizona	J Nash	315 California st	25	Nov 15
Silver King M Co	Arizona	J Nash	328 Montgomery st	50	Nov 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	Nov 12
Western M Co	California	C S Curtiss	309 Montgomery st	75	Sep 7

The Mining Share Market.

Stocks continue dull. The prospective flood of water in some of the big Comstock mines is discouraging to brokers as well as to miners. The only noticeable feature of the week has been Alta, in the lower levels of which it is hoped a bonanza will be uncovered. The Enterprise says it is quite certain that the Alta folks have cut some good ore with

vein—which is considered the extension north of the Bechtel lode, and extends from the Bechtel line north to the face of the bluff. The new Silver Hill mill is rapidly approaching completion, and all the other mills in the district, comprising 124 stamps, are at work constantly. Improvements are reported in the Champion, Con. Pacific and Boston Con.

NEVADA.

TAPPED A GOOD LODE.—*Transcript*, Nov. 17: The parties engaged in running a tunnel on the Homestead claim, on Myers' ravine, are said to have tapped a 2-ft. ledge of very good ore.

HAD TO STOP HOISTING.—Owing to a failure of the water supply, prospecting has been stopped on Kirkham & Hitchcock's quartz bonanza, at Blue Tent. Work will be resumed with redoubled vigor as soon as a good rainstorm comes. The boys talk of putting up steam power on their claim soon.

ANOTHER RICH STRIKE OF QUARTZ was made yesterday on Red hill, about a mile below this city. A chunk of the rock was shown us, which was profusely decorated with gold. The lucky finders are named Murphy and Underwood.

THE FORTUNA MINE.—It was expected that arrangements would have been made before this for the resumption of work on the Fortuna mine. Over a month ago, Gen. O. H. Lagrange, one of the owners, went to New York for the purpose. He had scarcely reached there, however, before he was recalled to San Francisco by a telegraphic dispatch stating that his wife was taken seriously ill. He immediately returned, but before reaching home, she died. This unfortunate occurrence interfered with his plans for several weeks. Last Tuesday he again left San Francisco for New York, and as soon as the matter is laid before the stockholders it is believed that orders will be given for starting the pumps and sinking the shaft to greater depth. The Fortuna company is composed of reliable men, and unlike a number of mining corporations who have eluded our merchants by running large hills and not paying them, they have always paid their indebtedness promptly every month. It is to be hoped that work will be resumed on the Fortuna at an early day.

THE MOUNTAIN MINE.—*Herald*, Nov. 13: The Mountain mining company has been able to have a 10-stamp mill erected on their property below Deer creek. Work has already been commenced and it is expected to have the mill completed and ready for crushing in a very short period.

THE BUELOW MINE.—A 10 stamp mill is being placed at the Buelow mine, situated on the South Yuba. This quartz claim promises to be a valuable piece of property, as it has a ledge about 13 in thickness and is good paying ore. As soon as the mill is put in operation, the mine will then double make a good showing.

THE DEADWOOD.—The Deadwood mine, situated in the district of Willow Valley, is again booming up. The pay chute, which gave out nearly one year ago, was again struck yesterday after the company expending nearly \$18,000 to find it. The ledge is 2 ft thick, and is a fine paying rock. The ore crushed during the past 10 months did not pay expenses. The cause of the pay chute being lost was owing to a mistake in the formation of the ground. The tunnel is now in 430 ft, and the prospects are excellent. The company will commence to crush next Saturday.

PLACER.

STILL FINDING THEM.—*Placer Herald*, Nov. 20: We learn from parties recently from Iowa Hill that Weske's drift claim on Sucker flat, which produced the \$1,200 chunk lately mentioned in the *Herald*, continues to turn out some fine specimens. Last week a chunk weighing 7 ounces was picked up in the claim, and this week another was found that weighed 9 ounces. The Almatina mine, which has been started up lately, is paying again, we understand, better than ever.

HUMBOLDT QUARTZ MINES.—*Dutch Flat Forum*, Nov. 20: There is but little being done over in the Humboldt mines at the present time from the fact that the water supply has about given out. The miners in that section, as almost everywhere else, are anxiously awaiting the rainy season. The Poole quartz mill is not being run more than 3 or 4 hours in every 24, the water being so low that they cannot run longer. The very first good shower of rain will give them an abundant supply and enable them to keep the mill running night and day. There is quite a large amount of ore ready for crushing in the Poole mine, and something like 150 tons of fine ore taken from the Boss mine now at the mill, which will be put through as soon as the water supply is increased by the rain. This lot of ore from the Boss mine is to be run through the Poole mill, and will be a practical test of the richness of the ore. All the assays heretofore made have given good prospects, and are confidently expected by the owners of the Boss that this test lot of ore will surprise everyone with a large yield of gold. There is but little being done on the Dorer ledge for the reason above—scarcity of water. The other many new claims in that locality are being prospected continually.

Dewey.—Work in the Dewey mine is progressing finely. They propose to commence hydraulicking as soon as the necessary arrangements have been completed. A large lot of hydraulic piping has been taken over to the mine from Dutch Flat during the past few days.

The cement mill, at the New Gold Run mine, is being run to its fullest capacity, crushing a fine lot of gold-bearing cement and gravel. The water supply is running low and it is feared the mill will have to shut down if it does not rain soon. A full force of men is employed in this mine.

ABOVE MICHAEL BLUFF.—*Placer Argus*, Nov. 20: The Golden Fleecy tunnel is now in 1,625 ft. A double shift will continue working in the mine all winter provided there is water enough with which to run the overshot wheel which runs the hoister and furnishes a supply of ventilating air. The shaft of the new Basel Con., otherwise known as the claim, is down about 170 ft. The mine adjoins the Golden Fleecy on the rear. In the creek claim, which is above the Golden Fleecy, gravel has lately been struck. All the ground between the Damascus and Golden Fleeces mines has been taken up by Messrs. Schneider, Mitchell & Hobson. This is one of the many evidences that the prospects of that section are flattering. Snow is the only drawback to that section.

PLUMAS.

THE BELL MINE.—*Plumas National*, Nov. 22: Mr. R. W. Stewart and Mr. T. G. Cragin, two of the stockholders of the Bell mine, at Elizabethtown, have been inspecting the property for several days. It is rumored that work will start up on the shaft, and that the mine will be thoroughly prospected at a much greater depth than ever before, and that the Jackass mine will also be developed.

THE MONTE CHRISTO.—On Sunday last we passed an hour or two at the Monte Christo mine on Spanish peak, and through the politeness of Supt. Smith and the foreman, Mr. Mahoney, were shown over the property. The new hoisting house is about completed. The scores are all in for a 9 months' siege, and the work is well advanced for the winter arrangements. The new building for the company's office and store-house is completed. The work in the mine is going on satisfactorily, and every crescent and shaft more thoroughly proves the value of the property. A hauling for the engine has been put in place, and will be at work in a very few days. A large Burleigh drill is also being fitted up. The main tunnel is to be run ahead several hundred ft this winter, and it is calculated that room for a large force of miners will be made by spring. The developments lately made show that the rich lode gravel is plentiful, and all that is necessary is time to open it up and put it in a shape to handle rapidly. This winter will be devoted to that purpose.

SIERRA.

GRASS FLAT.—*Mountain Messenger*, Nov. 20: B. F. Baker has cleaned Grass flat as clean as a base-hall ground, every stump and tree taken off. All hands are now at work on the incline.

SHUT DOWN.—The hydraulic diggings at Logansville have all shut down, owing to the cold weather freezing up the water.

READY.—The miners at Eureka are all ready for water, which seems slow in coming.

MORRISTOWN.—Supt. Wheeler, of Morristown diggings, has about 80 white men and 60 Chinamen at work fitting up a shaft in this spring. He is enlarging the main ditch, and extending the water to Craig's flat to commence at the lowest point and work up.

UP-RIVER NOTES.—*Cor. Mountain Messenger*, Nov. 20: The Eureka Con. Co. are now in 230 ft with their tunnel, working 4 men. A new contract of 100 ft has just been let, at \$3.50 per ft, to Dorsey, Leary & Quinn. Formation, blue cement. Last Chance Co. are running a bed-rock tunnel, Williams & Nichols, contractors. They are now in about 300 ft. Savage mine has been closed for the winter, water being all frozen. The recent fire only destroyed the old stable and cabin at the shaft, together with a horse, owing to the rapid progress of the conflagration. The engine house was saved by unceasing exertions all through the night of those in charge of the mine. Supt. O. B. Stevens has gone to Virginia City to arrange for resumption of operations in the spring. Eintracht Gravel M. Co. has shut down for the winter. Phoenix Co. have struck quartz that averages \$30 to the ton. The chimney developed is 250 ft long, and ledge is from 3 to 6 ft wide. Rising Sun Co., Logansville, are extending the South Branch Water Co.'s ditch to their claims, and will be ready for work next week. Haskell Peak Co. is in 80 ft, sinking for bedrock. Blue Oravel Co. is in 200 ft in fine looking gravel, half of which is washed quartz. 1,001 Co. is in good paying gravel, but have no water. I saw a prospect of \$1.25 worth of gold, washed out of a pan of gravel.

NEVADA.

WASHOE DISTRICT.

MINING NOTES.—*Virginia Enterprise*, Nov. 20: At the Union Con. mine a drift is being run east from the bottom of winze No. 1, on the 2600 level, to give room for working the diamond drill. A space of about 22 ft is required for the drill, and for the drawing of the rods. The water at the bottom of the winze remains about the same. As soon as this drill chamber is completed a hole will be drilled to the eastward, in which direction it is expected the water will be found. West crescent No. 1, on the 2500 level, is cutting streaks of quartz assaying from \$1 to \$30. The indications are that no solid body of ore of any considerable width will be found at this point.

At the Sierra Nevada the work is still confined to the southern parts of the mine, and the prospecting drifts have not as yet found anything of more value than the streaks of ore heretofore mentioned.

At the middle mines progress is slow at all points and the work being done is principally preparatory. The south drift on the 2400 level into the Potosi ground is making good headway in dry ground. It is not safe to attempt running crosscuts in any of the mines of this series until the high hydraulic pump is started at the Chollar-Norcross-Savage shaft.

BELMONT DISTRICT.

THE BARCELONA.—*Belmont Courier*, Nov. 16: Work in this mine is progressing satisfactorily. The ore is accumulating fast, and there is a large amount of first class ready to ship as soon as teams can be procured.

This Belmont mill will soon be put in order and started on ore now on the dump, aggregating nearly 3,000 tons, including about 400 tons first-class rock.

COLUMBUS DISTRICT.

NORTHERN BELLS.—*True Fissure*, Nov. 13: All work in the mine is being pushed ahead at fair speed, 82 tons of ore being extracted and sent to the mills daily. The various ore stops in the level above the adit continue to yield the usual quantity and quality of ore, and also promise finely for the future. The haulage shipments for the week ending November 12th amounted to \$21,522.61; for the month to same date, \$35,013.36.

MOUNT DIABLO.—No ore is now being taken out, but the work of prospecting is vigorously carried on.

MOUNT POTOSI.—An experienced miner who made an inspection of the mine a few days ago reports the prospects good. The mine is looking well.

WINDSOR.—The work of prospecting continues, with favorable results. The ledge recently struck is being developed. The managers of the property are satisfied with the prospects.

VICTOR.—Work has not yet been resumed in this mine, the business complications of the company not having been adjusted.

ESMERALDA DISTRICT.

PROSPECTUS.—*Esmeralda Herald*, Nov. 20: The Prospectus, under the superintendency of Wm. Irwin and the foremanship of Mr. Ford, is pushing work in both the Prospectus and Biadell tunnels. No new developments have as yet been made, though from the looks of the ore on the dump the prospect ahead is flattering.

GOLD MOUNTAIN DISTRICT.

NEW LIFE.—*Esmeralda Herald*, Nov. 20: The starting up of the State Line mine in Gold Mountain district will give it a new lease of life. The mine, of Li Valley, Silver Peak and Montezuma all within a radius of a few miles—new life, and as the mines of these districts possess merit, a stampede in that direction may at any time be looked for. All these districts are in Esmeralda county.

STATE LINE.—The State Line mine lies in Gold Mountain mining district, in Esmeralda county, and about 12 miles southwest of Lida Valley. It is on what is called the State Range, and is considered one of the finest series of mining property in the State. A depth of 200 ft has been attained, and the average width of the ledge is 20 ft, the whole of which will give \$45 per ton. The only drawback is the water, which has to be brought in pipes a distance of 12 miles. There is wood in abundance within 4 miles. A short time since the mine was sold to the present owners, Messrs. Taylor & Co., by Steve Roberts, Al Cortez and others. Isaac Taylor left Carson City Wednesday morning to take charge of the mine. We understand that machinery is to be put up at once, and the property worked in a business-like manner.

I X L DISTRICT.

NEW MILL.—*Silver State*, Nov. 15: Henry Lorenz, who is engaged in mining at I X L district, informs us that a 10-stamp mill is to be built at once on the Bayfield mine. The machinery is now on the way, and it is expected to be in running order before the 1st of February. The East Star Co. has entered into an agreement to have 100 tons of ore at the mill before next April. New locations are being developed, and this year the most profitable of the I X L people to get their supplies, as the road can be traveled summer and winter. He thinks I X L is destined to be quite a mining camp, and as soon as the mill is completed a great many people will settle in the district.

PIOCHE DISTRICT.

ONE.—*Pioche Record*, Nov. 16: The works at Bullionville employ about 60 men. As soon as the sampling machine is in readiness, Messrs. Godhe & Hampton will purchase all the ore that will be hauled to them, and will pile it on the dump to await the completion of the furnace.

ARIZONA.

MINERAL CREEK.—*Globe Chronicle*, Nov. 14: The Mineral Creek mining company has completed the main tunnel with the shaft. The company is going to commence the building of an ore dump at once, and prepare to open stops along the line of the tunnel, and finish the road to the mill, preparatory to shipping ore there for reduction. They are getting along well with the erection of the mill.

LEXINGTON.—This claim is about half a mile south-westerly from the Trojan, and shows well on the surface, while the shaft, 60 ft, and a drift on the vein of 15 ft at the bottom, has a well-defined vein of milling ore from 2 to 3 ft wide. The 80 ounces of this ore on the dump will average \$100 per ton.

EUREKA.—This is one of the earliest lodes discovered in the Gold Hill section, having been on the Eureka and Munsee locations, worked over 4 years ago, while in 5 of the principal locations upon it there is a good showing of high-grade ore. The ore streak and dump will return at the mill from \$30 to \$50 in gold per ton, and some silver. The Yarrow tunnel—This is the next claim northeast from the Amalia, and on it the lode has been thoroughly prospected near the surface by its Mexican owners. There are over 20 holes and cuts all along the ledge from 5 to 10 ft deep, and 4 to 8 ft wide, besides an open cut of over 40 ft long, with the ledge in sight from all of their openings. It has yielded good milling ore, which was worked in armstrong, and returned from \$50 to \$75 per ton.

THE YARROW TUNNEL.—This adjoins the Munsee, and shows the same ledge and ore on the surface. A tunnel has been run 137 ft to crosscut the ledge at 80 ft deep. They have still 40 ft to run before striking the ore body.

GOLDEN OATS.—Mr. Klein is now at work sinking a shaft on his claim, and with good results, as it has the ledge very solid and holding good ore at 15 ft deep. They found high-grade ore, which fills the shaft. From samples we have seen, which have free gold all through, this opening will yield as rich ore as that at any other point on the lode. A combination tunnel has also been run 200 ft between the claim and the Golden Star, and in a drift of 20 ft on the ledge they have a streak of rich ore from 2 to 3 ft wide.

THE GOLDEN STAR.—On this claim there is a drift of over 60 ft at the end of the tunnel, which has yielded over 200 tons of good milling ore. There is another tunnel of 65 ft, which cuts the lode and shows a large body of good milling ore. Altogether this lode, in all its various locations, shows as continuous and large a body of ore as any we have seen in the district.

The Townsend mill is working steadily, and although they cannot, with their present mill arrangements, recover all the gold and none of the silver in the ore, it is paying extremely well, more especially as 5 men on the mine are sufficient to get out enough ore (about 2 tons a day) to keep the mill going. From the show of ore in the mine, there would be no difficulty in keeping a first-class 10-stamp mill in constant operation.

The Golden Eagle mill is working regularly and smoothly, their being no hitch or contretemps. This is the result of getting practical mill men like Messrs. Palmer and Rice to erect such mills, so that the hullian output once regularly started can be depended upon by their owners.

The Moderator, adjoining the Empire, and in line with the California, near Ramboz camp, is turning out remarkably well. Mr. Burke purchased the property a short time ago from Doc. Wilson and W. A. Holmes, and in performing assessment work has discovered 16 inches of chloride of silver ore assaying \$190 per ton. The ore resembles that of the California.

CENTENNIAL MINE.—Reports from the Centennial are still of an encouraging character, the mine continuing to yield the same rich ore as heretofore reported. During the week Mr. Hillings has been making some very interesting experiments at the fashella mill that will be of interest to the entire district. Twenty tons of second-class Centennial ore have been worked by wet and dry process, and today roasting will be tried. Careful assays of the pulp and tailings are being made, and in a few days we shall know the best method of working such ores. Mr. Hillings is of the opinion that roasting will save a higher percentage. The average pulp assay of the 20 tons second-class ore worked was \$102 per ton. The first-class ore ranges from \$900 to \$3,000 per ton. During the week 70 tons of ore were shipped to the mill.

MOUNT DEVELOPMENT IN PATAGONIA.—*Arizona Citizen*, Nov. 13: J. D. Andrews left Monday with a team loaded with tools and supplies for Patagonia, to take charge of and put a force of men at work on a group of 6 claims owned by a strong Pennsylvania company, of which Mr. J. N. Freck is manager. Mr. Andrews is instructed to commence work at once on all 6 claims; and on the Good Hope mine, which has already been developed sufficiently to gravitate a valuable body of ore, he is to sink a working shaft 150 ft. Mr. Andrews has contracted to develop other properties in that vicinity, as he has mines of his own to look after. During the past 6 months, Mr. Andrews has been in charge of the San Xavier mining and smelting company's mines, and leaves the same in good order to fulfill contracts made with manager Freck last spring.

A GOOD PROSPECT.—The Black Jack mine, on the western slope of the Mule mountains, has a shaft down 22 ft, and is progressing at the rate of 1 ft a day. The last assay shows \$84.25 silver and 35¢ copper, equal to a total of \$24.25. The walls are well defined, being true and well cased. The owners propose to continue the work, and feel confident of being able to show up one of the best mines in southern Arizona.

SAN XAVIER MINE.—Now that the San Xavier mining and smelting company's mine is turning out a booming success, it is hardly surprising that the claims owned by them have been recently located showing now heard from. The Little May takes the lead among the latter as a haulion producer. With but little work of 2 men they have several tons of high-grade ore sacked, and in a short time will make a shipment of a carload to San Francisco as a test. It is expected that the shipment will average from \$400 to \$500 per ton.

One has been discovered of a good quality in several places on Mule mountains, which has caused quite a stampede to secure good ground. Messrs. Jackson, Gleason and Flattery have made quite a number of locations, among them the Mayflower and Contentment, all of which are good locations with rich ore. Messrs. Andrews and Smith have also made several locations, some of which show well, particularly the Oro Fino mine, Standard copper mine and the Terror. The latter is a very rich ore on Santa Cruz locations, near by, show some very rich ore on the surface, on which work will not be commenced till after New Year. There are quite a number of copper claims in the immediate vicinity. The Catalina and Solid Muldoon show large bodies of carbonate ores that can be very cheaply reduced to bullion; also the Papago Chief mine has large bodies of carbonate ore, and the latter is in a large way all the way down. The Esperanza mine will soon have steam hoisting works, which are very much needed, as they cannot go any deeper on account of water. Quite a number of locations in and around the Sierritas are now being worked on, and it is work on mines that is bringing Pima county to the front.

COLORADO.

ATLANTIC DISTRICT.—*Colorado Miner*, Nov. 14: The Snowy Range is one of the most important discoveries of the past season. It is opened by a shaft 50 ft deep, which shows a large vein carrying copper pyrites and silver glance. There have been some 100 tons of ore taken from this property, the highest mill being 250 ft. The highest mill of silver per ton, and the lowest 105. The Little Emma, Pleasant Hill and Homestake are new claims with old names, which are highly spoken of by others than their owners. They all lie near the Snowy Range, the Pleasant Hill being an extension of that lode. These claims, with many others, have been located and recorded ready for starting up in the spring. There is no question that the mines of this district will make their market next season. They are usually large, decided fissures, easily traceable for long distances on the surface, and are in the hands of men who will prosecute their development.

DAILY DISTRICT.—What has been said of Atlantic district may be said of Camp Robinson, the head of Ruby gulch, Daily district. The Silver King, Ketchikan, Shock, Ruth, Overhartz and other adies, are all promising locations of last summer. A year was not time to make due preparation for working them during the winter season, they will remain dormant until spring.

RABBIT EAR RANCH.—Mr. C. H. Hook has just returned from over in the Park, and says that in no time in his

tory has the mining outlook been so bright. The Grand Lake, Alvin Hubert, Hendershot and Morgan lodes are looking exceedingly well.

MIDDLE PARK NEWS.—Capt. Hornbrook came over from Middle Park last Saturday. He reports about 4 ft of snow in the Rabbit Ear Range, which has stopped all out-door work on the mines. A crosscut tunnel 43 ft in length has cut the Hidden Treasures lode 23 ft in depth, and is connected by a shaft to the surface. A drift has been extended 24 ft, and the workings on the vein show from 20 to 24 inches of mineral, carrying more or less gray copper. The Wolverine mine is showing larger quantities and better ore than ever. The company working 23 shifts and will soon work 3, and will continue development all winter with 9 men.

IDAHO.

BAT HORSE NOTES.—*Yankee Fork Herald*, Nov. 13: Dan Sullivan, who came over from Challis Thursday, informs us that the smelter at Bat Horse, after a run of nearly 3 months, was to have shut down yesterday. During the time it was running from 80 to 100 bars of bullion were shipped daily. They weighed 100 lbs each, and were worth 800 ounces per ton. Dave Woods and Sam Staples commenced work on the Excelsior last week. It is one of the best mines in the district. Work will be continued all winter on the Beardsley, Silver Wing and Hood mines. The men have been disappointed in the claims Horn, as no more work will be done on it for a while. The enormous shipments made from the camp this year were above the most sanguine expectations, and another stack will be added to the smelter as soon as spring opens. Bat Horse is undoubtedly one of the richest districts in the Territory.

CUSTER MILL AND MINE.—Work is progressing finely on the Custer mill. The interior work, the shaft and the brick work for the roasters is progressing rapidly. The machinery is being put in place and it is expected crushing will commence about the 15th of December. The ore house, at the back of the mill, is a 2-story and will hold an immense quantity of rock. A fine and commodious assay office has been completed. The ore now being taken from the mine is better than any ever before encountered, and the mill could easily be kept running at a rate of \$500 per ton for several months should the company so desire.

SAW TOOTH.—A good mining and business boom is expected in the Saw Tooth and Wood River camps next spring. As early in the season as possible the wagon road will be extended from Galena over the Wood River divide to Salmon valley, distant 4 or 5 miles. This will be a great convenience to the upper Salmon mining camps. The probability now is that 2, if not 3 mills, will go up in the Saw Tooth, where the ore is all free milling, and at least 4 smelters it is believed will be erected at Galena in the spring or summer. Many of the best properties in the neighborhood of Galena have passed into the hands of capitalists. The mines are developing beyond the expectations of the most sanguine. The ore, all though rich at the surface, show still greater wealth in depth is obtained, some veins carrying streaks of ore that assay from 1,000 to 10,000 ounces silver per ton. The ledges are generally from 3 to 4 ft in width, well defined and in formations that indicate permanency. In Smiley's canyon two companies are at work—the Emma and Vienna. The Emma is owned by Messrs. Levi Smiley, the discoverer, and Geo. R. Ayer. A 76-ft shaft on the Vienna shows a 4-ft vein of good ore, most of it assaying from \$300 to \$1,200 per ton. The Vienna, from which ore has been shipped to Salt Lake the past season, is the best developed mine in Smiley canyon. At a depth of 250 ft from the apex or point on the ridge at which the discovery was made, the vein is 4 ft in width, the best ore sampling over \$3,000 per ton, and the medium from \$100 to \$500 per ton. A tunnel is now being run to open the ledge at still greater depths.

BEAVER.—The celebrated mine of Beaver canyon are located about 4 miles up the gulch from Saw Tooth city. Much work has been done on the mines this season—enough to prove their wealth and permanency. Among these are the Columba and Beaver, owned and operated by New York parties. Tunnel contracts have been let on these mines, and they will be further developed this coming winter. The Columba mine shows a vein about 400 ft long. The Beaver is this fall, and has large quantities of 150 ore on the dumps. The Beaver shows a strong vein of black sulphurets. Col. Broadhead has the management of the mines. The noted Pilgrim mine has a shaft 90 ft deep, all the distance in very rich ore. The vein is, at the widest, 22 ft in width, 6 to 8 ft of which is rich in ruby and native silver. A tunnel will be run this winter to open the vein at a depth of 300 to 400 ft. There are other rich mines in the immediate vicinity of the Pilgrim that contain high grade ores. In Lake canyon are the Cambria, Wire Silver and Comstock; and a little further on are the Scotia and Lucky Boy—both very rich and developing splendidly. The latter mine was recently purchased by a New York company for \$50,000. Some of the ore assays well up into the thousands. The Lucky Boy company expect to put up a mill next season. North of the Lucky Boy are the Atlanta, Idaho, Summit and others, all of which carry more or less rich ore. The prospects at present indicate that before another season is over the Saw Tooth camps will be noted far and near for the richness and abundance of their ores, and there is yet much unexplored country for the prospector to operate in.

MONTANA.

MADISON COUNTY.—*New Northwest*, Nov. 12: Messrs. Hall & Rosier cleaned up the fume at Summit for the season, last week. They have taken out 1,500 ounces of gold dust for their summer's work. Old Alder continues to pungle handsomely for ye horny-fisted miner. Last Saturday Edward Herendeen deposited with carrier Elting I, Highland fume company, in Alder gulch. The expenses of working were less than 17% of the yield.

PACIFIC.—*Butte Miner*, Nov. 16: The main shaft is 50 ft deep. From the bottom the drifts have been extended west 50 ft and east 115 ft, according to yesterday's measurement. In the east drift 4 men are employed, and in the west 3. The drift is a mill next season. The idea of extracting daily 20 tons of ore, from which about 500 lbs of gold ore of the size of the ore body. Several hundred pounds of ore are in the dump which will average from \$30 to \$35 per ton. It is perfectly free and can therefore be easily milled.

NEW MEXICO.

SALE OF CLIFTON PLACERS.—*Herald and Southwest*, Nov. 13: We take great pleasure in announcing the fact that all the placer mines in and about Oro, in the Greenlee Gold Mountain mining district, have been consolidated and sold to Boston men. Some time last spring our townsmen, W. H. Newcomb, negotiated the sale of certain individual claims on the Fresno River, and personally supervised prospecting in and about this district. Becoming more interested, the further he pushed his examinations, he furnished a large amount of money and thoroughly prospected the banks of the river for some 10 or 12 miles from Clifton. During June, July and August a force of men was put to work, and several thousand tons of gravel were put through the sluices. A clean up of certain and was put through simple surface workings were satisfactory, giving great encouragement, and warranting erecting hydraulic works second to none in California. In August Dr. J. P. Welch, the well-known manager of the Canyon del Agua property, visited Silver City, and became interested in these placers. He visited Clifton and Oro, and certain claims below those owned by Newcomb and others, and desired to prospect farther up the river. Returning shortly after to Silver City, a consultation with Newcomb and others, resulting in a proposition from Dr. Welch, who, representing capitalists both here and in Washington, was in a shape to take the whole mass of claims lying both sides of the river for some 5 miles, also claims others lying back from the water course. These properties have been bought and will be consolidated into one company. The consideration paid is upwards of \$1,000,000, and showed observers claim the properties are well worth the purchase money. The water is on the property, giving investors natural advantages which have been so dearly paid for in other localities.

Tallow Butter and Lard Cheese.

Our simple-minded dairymen who are still using pure milk for their butter and cheese-making, have but little idea of the elaborate mixtures which are creeping into the Eastern manufacture of dairy products. They have, of course, read of the millions of lbs. of tallow butter which are consumed in New York, and shipped thence to Europe, but the subject doubtless impressed them only as a distant abomination which gave no menace to local industry. Such indeed it is, but there are reachings out westward, which give the matter no little pertinence here. We were not a little startled to receive in the mail this week a postal card, postmarked at one of the large cities of western New York, which reads as follows:

SIR:—If you will save your slaughter and kidney bullocks fat clean and sweet, and pack same day as you ship it, and drop card, I will pay five cents per lb. for it and pay freight. Salt barrels will answer; and as it is for tallow butter making, must be free from sweetbread. It should be bung up to cool quick in the air before being put into barrels, and not cool off in the barrel. This is a new outlet for fat at an advance rate while the usual outlet is declining.—Yours, etc.,

This message was doubtless intended for some butcher in a neighboring town, but our address was by some mishap placed upon it. The significance of the message is, that the large manufactories of tallow butter adjacent to the slaughter houses of New York and Brooklyn have found that the metropolitan supply of tallow is not enough to meet their needs, and so they are reaching out after the refuse from the country butchers. This is only what might have been expected, when the enormous mass of tallow butter produced is in mind, but it is nevertheless startling to be brought face to face with the fact. The thought that the fat from the thousands of country slaughter houses, most of them reeking in filth and filled with an atmosphere of intolerable stench, should be cast into old barrels and shipped by rail to the dens of the tallow butter-makers, and there mangled and tortured into a wretched counterfeit, to be offered to consumers as a substitute for the fragrant product of the farm, is not a pleasant one to a person who takes pride in the history and progress of our grand dairy industry. And yet just such is the course of affairs. Not only to western New York has the greed for cheap fat extended. It has erected its temples in the great cities of the west, and has penetrated beyond, even to the heart of the dairy region of Wisconsin, where we read there is a counterfeit butter made by mingling a certain proportion of tallow with butter instead of producing the counterfeit from soft tallow churned with sour milk, which is the method of the "pure counterfeit." It is natural that the butter-makers of the east are up in arms against all these devices, and our exchanges are holding up for reprobation the names of the firms engaged in the manufacture and traffic.

Another style of mixture which seems to be gaining some ground in eastern dairy produce, and which strikes us as much less objectionable than the counterfeit butter, is the introduction of a small percentage of lard into the skim milk for the manufacture of an improved skim milk cheese. This is now being done in St. Lawrence county, New York, where there are large butter factories, and, consequently, a large amount of skim milk to be turned to some account. Skim milk cheese is, as a rule, poor stuff—hard, indigestible, and a drug in the market. It is found that by adding $\frac{1}{4}$ lbs. of pure lard to 50 lbs. of skim milk there is produced a cheese which is rich enough in fat, and becomes palatable and digestible. This introduction of fat is analogous to the use of lard as "shortening" in kitchen practice, and if done in a cleanly manner can hardly be more objectionable. As there is a strictly fine article of creamery butter, made from the cream which is removed, and as the skim milk is handled in the dairy factory, it strikes us as a legitimate saving of the skim milk, which, without the addition of the shortening, could only be used as food for calves and hogs. The pecuniary aspect of this method of cheese-making is given as follows:

One hundred pounds of new fresh milk yields 4 lbs. of butter and 80 lbs. of pure sweet skim milk; to that skim milk add $\frac{1}{4}$ lbs. of lard, and it produces 8 lbs. cheese, which, at 8 cents amounts to 64 cents; without adding lard, it produces 6 lbs. cheese at 6 cents, 36 cents; add cost of lard, say 14 cents; total 50 cents; difference in skim milk by new process, 11 cents; thereby making the value of 80 lbs. of skim milk worth 11 cents more by using the new process than it would be using the old methods, besides producing a quality of cheese that will be readily bought.

There are in St. Lawrence county at least 90,000 cows. A cow during the factory season should produce 3,000 lbs. of milk. Deduct one-fifth for skimming, leaving 2,400 lbs. skim milk, increased by using this process 11 cents per 100 lbs., would make \$2.60 per cow on the product of factory season of six months, and you have a grand increase in the county of \$225,000. The milk from 40,000 cows in the county is now manufactured in cheese factories. Increased by this process \$2.50 per cow, you have a grand total of \$100,000, and every dollar of that goes into the pockets of the dairymen.

Thus we have the latest phases of two of the newer practices in connection with dairying. The first seems to us thoroughly objectionable, as it results in a counterfeit, employs the basest materials and builds up, in opposition to legitimate dairying, a business which steals the form of the genuine to serve the false; the latter enables the dairymen to gain the profit of fine butter making and then adds him to turn his skim milk into a palatable and digestible cheese.

The Mold of Bread.

With a view of interesting our readers who may have microscopes, but have not done much in the study of microscopic fungi, we shall give a chapter or two concerning the structure of some cryptogamic plants which one meets with most often. Among these are the molds which form upon foods, upon the walls of damp buildings and upon many other objects. One of the most common of these is the mold of bread which we choose for illustration and description upon this page.

The name of this mold is *penicillium crustaceum* and it belongs to the order of fungi called *Hyphomycetes*. The predominant feature in the structure of this order, according to Cooke, consists in the development of the vegetative system under the form of simple or branched threads on which the fruit is generated. One of the large genera under this order is one which includes the black molds which are seen on decaying wood and the like, and another is the *Mucedines* or molds on food, etc., to which we would especially refer.

In the engraving, *a*, is the bread mold as it appears to the naked eye when full grown. It is trite to say that such a patch of fungus would look like a forest if examined with a microscope,

when a proper foster substance is exposed. These fungus spores have been gathered from the atmosphere and identified by the microscope.

Molds may be guarded against by fresing the apartment from moisture. Thus, opening the windows and admitting the sunlight, will arrest the formation of mold upon the walls of a damp apartment. A similar result can be attained in cloudy weather by building a hot fire in the room and drying the air thoroughly. In cellars and the like, the fungus can be arrested by a free use of powdered sulphur, or by occasional whitewashing. Such precautions should always be taken, for an atmosphere which favors the formation of mold is not favorable to health and bodily comfort.

THE PROFITS OF MINING.—Legitimate mining in the United States offers better inducements to persons seeking investments than any other industry, not excepting agricultural or commercial. Carefully compiled statistics show that for every dollar expended in searching for gold, between four and five dollars are realized. A great proportion of the failures that occur in connection with this pursuit are due to gross mismanagement. Men who would not for a moment entertain a thought of embarking in a mercantile venture without having an extended experience in the particular line of business,



GROWTH OF BREAD MOLD AS SEEN WITH THE MICROSCOPE.

and how far this is true may be learned from Fig. *b*, which shows the mold as seen with a moderate magnifying power. It is plain from this that the mold is really composed of minute plants. The manner of its growth is by the ramification of minute filaments (called the mycelium of the plant), and from these, here and there, there arise thread-like stems which branch at the top and throw out rows of spores like strings of beads. As these spores ripen they are represented as dropping from the plumed top of the stem. This figure is magnified 420 diameters, a power which can only be satisfactorily attained with a compound microscope. The same fruit-bearing stage of the fungus is seen still more enlarged at *d*, merely the apex of the fruit stem being shown and magnified 620 diameters. A single chain of spores is still more enlarged at *e*, and the spores are seen to be perfectly formed spherical bodies or cells, but slightly attached to each other. As they ripen this slight attachment gives way and the spores are free. They go hither and thither and when they fall upon a favoring substance they send forth sprouts as seen at *f*, and thus new patches of mold are quickly formed and spread so fast that the substance is quickly enveloped in the coating.

It is often asked, whence comes the mold which quickly attacks food left exposed in a damp atmosphere. It has been demonstrated that the minute spores are carried everywhere in the air. They are so minute and so light that their transportation is easily effected. As the seed (as it were) of the fungus is thus ever present it needs but the proper conditions of

and also having about them a corps of equally well posted assistants, will rush blindly into mining and place complete reliance in luck. Such men regard their efforts as a mere gamble, and are successful about as often as the faro player. The other class of mine owners who in developing their properties put every dollar where it will do the most good, require their employees to do a good day's work for a good day's wages, save a dollar here and a dollar there wherever they see an opportunity above or below ground, are practical miners of wide experience or else have under them in every department trustworthy men, while they themselves are shrewd financiers—these men are almost always successful. A failure with them is the exception, while with less shrewd investors it is the rule.—*Nevada Transcript*.

AMERICAN MECHANICAL ENGINEERS.—The first annual meeting of the American Society of Mechanical Engineers commenced its session November 4th, at the rooms of the American Society of Civil Engineers, 104 East Twentieth street, New York. This society was organized in April last "to promote the arts and sciences connected with engineering and mechanical construction." Prof. Thurston, the Secretary, has issued a circular to the members, urging their full participation.

The last experiment to find a substitute for water in steam boilers seems more promising than any heretofore made, and consists of hisulphide of carbon used in connection with petroleum in proportion of three of the sulphide

The European Phylloxera Congress.

As many of our readers are aware there is an organization in Europe composed of leading entomologists and others, entitled the "Phylloxera Congress." This body has had meetings at different points in the infested districts, and has promulgated several manifestoes against the pest. The last meeting was held in Saragossa, Spain, and a report thereof has been furnished to the *New York Herald*. It does not appear that any sovereign cure for the evil has yet been brought to light, excepting such indirect escapes from destruction which have been suggested. However, there were several points of interest brought forward, which are contained in the following paragraphs: On the third day of this congress, M. Planchon, the French savant and traveler of repute, opened a vigorous campaign in favor of the American vines that he had studied and examined in the States. He laid down as an axiom that no American vines are proof against the phylloxera, but that they have such powers of resistance to its effects that they can be and ought to be seriously recommended to wine growers all over the world. According to Planchon these powers of resistance, greater in some classes of American vines than others, arise from their anatomical and physiological conditions. Directly after M. Planchon, the learned professor of the School of Agriculture in Montpellier, took up the same subject and demonstrated that from his own practical experiments at Montpellier, and from experiments on a large scale in the southern departments of France, it was a proven fact in the eyes of scientific men and in the annual vintage of wine growers, that American plants produce as many barrels of wine per acre as the French vines, and if grafted with the *vitis vinifera* they produce capital results. The last assertion of Prof. Saint-Pierre was ably supported by the great savant, M. Foex, who reviewed all the varied species of American vines that have been successfully introduced in Europe, and refuted the theory of some authors who pretend that American vines, owing to their robust and rather spreading exuberance of roots, require a rich soil and deep hed of resisting strata. Prof. Foex proved by examples from the vineyards of Languedoc and Aquitaine, from instances in the valleys of the Rhone and Garonne, where the soils are so varied and different in point of resistance and depth, that the species *Solonis*, *Violla Riparia*, *Agresta* and *Taylor* have all been used for grafting purposes with the old French plants, or for new plantations, and success in point of production, as well as in powers of resistance to phylloxera invasions, has been clearly attested even by unscientific observers. Next to the French Professor the American vines found a very decided champion in Baron de Prato, the Austrian delegate, who declared that in his travels in France, Germany and Italy he had more than once noticed the contrast between American plants, still vigorous, covered with green foliage and fruit, though they were attacked with phylloxera in their roots or trunk, and a few yards off the native plants, French or Italian, were shriveled, leafless and utterly useless for producing wine or fruit.

The question of remedies and palliatives was discussed at length in the congress, and most of the French and foreign savants seemed to patronize the liberal application of bisulphide of carbon to destroy the insect, and of sulpho-carbonate of potash, which tends to strengthen the plant itself. Senora Miret and Munoz Castillo gave interesting data on the researches made at the expense of the government and of the provincial councils to find some insecticide substance, and the almost general failure of these panaceas until water, fire, and finally the pulling up of the infected plants were resorted to, as the same means had been attempted in France and Italy. In one French department—Le Gard—out of 94,000 hectares of 376,000 acres of vineyards, more than five-sevenths were uprooted. After long debates, in which natives and foreigners came to the conclusion that the best preventive precautions were in vigilant examination of the vines, in good manures and careful tilling of the soil, in severe measures against the infested districts or countries and their exports, the congress closed, after adopting the following resolutions:

First—To defend the vineyards at any cost whenever it may be possible to do so, and to prevent the invasion and propagation of the insect at any cost.

Second—The extinction of all focuses of phylloxera by insecticide substances and other modes of relief that must be employed in the cases that science and experience may recommend.

Third—When the varied means of extinction are inefficient, wine growers must have recourse to the American vine.

Fourth—In future plantations of resisting American plants must be organized in every province and wine-growing center, and the plants so introduced must be distributed among the cultivators of the vine to allow them to study their conditions of adaptations.

Fifth—In the districts that are completely infested, the authorities ought to allow the immediate and direct introduction of American shoots for grafting purposes, but without trunk or roots, and such shoots, if they are of the year's growth, must be brought into the country with all the precautions that the administration and science may deem necessary, and subject to all the prescriptions that laws and regulations may determine.

Sixth—The congress must respectfully inform the government that it deems a reform of the actual legislation on the phylloxera necessary and most urgent.

These resolutions have struck every one as proving that the congress had not achieved much in its 11 sittings beyond recommending the introduction of the American vines, now

Persevering Gravel Miners.

A *Phmas National* reporter recently made a trip to the Elizabethtown country to look at the famous mine owned by Messrs. Loring & Leavitt. The story of the mine, as told by the reporter, shows what energy and pluck and perseverance will do. The *National* says: The mines at Elizabethtown were discovered in 1852, and for several years it was a very lively and flourishing mining camp. The bench claims on both sides of the town were notable for their rich deposits, while Emigrant hill, just above town, turned out thousands of dollars. Betsy gulch, also very rich, empties into the flat almost directly at the point now being worked. The channels were broken up, running for several hundred ft. in some places, and then ending abruptly. In places the pay was enormous, and cravies which produced hundreds of dollars in a ft. or two were nothing unusual. In many places these channels broke down into the flat on which stood the town, and many old miners had an idea that the bottom of this flat was good, but as it was supposed to be deep, with considerable water to interfere with the working, it was left for the present owners to develop. One shaft was sunk by Judkins & Co. in 1853, but they got into trouble about the time that bedrock was reached; the work was abandoned and the shaft gradually filled up. The old claims passed from one owner to another until purchased by Messrs. Loring & Leavitt. They worked in several places, with varying success, until some five years ago, when they concluded to test this flat, and to that end commenced a drain tunnel, which they have been pushing steadily ever since. Pay ground was found several times, but usually it "jumped off" too deep for their tunnel, and they were obliged to leave it behind. They persevered, however, and pushed the tunnel under difficulties which would have appalled almost anyone but them. Thirty-two hundred ft. of this tunnel were cut, and all solidly timbered, in many places the "lagging" having to be put on top, sides and bottom, and the cracks battened to keep out the quicksand, which would fill the tunnel in an hour through a crack a quarter of an inch wide. They got into bedrock last winter, and this spring, or rather this summer, they struck pay. Considerable work has been done since then, and the "pay-streak" pretty well developed. They have demonstrated that it is 70 ft. in width, and it may be much more, as the cross tunnel has not found this end of it. The main tunnel has progressed up the flat, directly towards Emigrant hill, over 100 ft. all in rich pay. The ground averages about \$20 to the man per day, and will do much more than that when they get into good shape for "blocking out." Of course the pay is not regular, as the rich deposits are found in favorable crevices, but all of the gravel taken out has more or less gold in it, and it is rich for from one to three ft. above the bedrock. The gold is the regular old-fashioned Elizabethtown lead gold, pieces ranging from a cent to \$50. Nearly \$400 came out of two sets of timbers—about eight ft. of tunnel—a week or so ago, and the service was crossed and left until the breasting commenced. Probably that crevice will yield several thousand dollars. The work is done through shafts about 60 ft. in depth, and the dirt is raised by the power of an overshot wheel. Several hundred ft. of pay dirt is certain between the works and the canyon which comes down from Emigrant hill, and as it is very wide they are sure of many thousand dollars before it is cleaned up. It is also certain that they have run over and left behind a large section of pay-ground which will be opened up after a while. On the whole we can see no possible chance for a failure, and with good management the present owners can safely count on quitting the mine in independent circumstances.

We congratulate Messrs. Loring & Leavitt on their success. They deserve it if anybody does, for they have labored long and faithfully. With the main tunnel and the numerous cross-cuts, prospecting drifts, shafts, etc., it is probable that they have run 5,000 ft. of tunnel before they found pay worth speaking about, and Mr. Leavitt informed us that for three years before the "pay-streak" was discovered, he did not make a "four-bit piece." They had no capital but their muscles, and with that alone they have overcome the obstacles in their path and gained a splendid success.

There are many more just such places in this immediate vicinity, and with the capital coming here for investment, and the interest now being taken in prospecting, it is certain that they will be developed.

THE railroads of this country continue to prosper, their earnings being considerably ahead of those received during a corresponding period for the last few years. The fact that this improvement is not confined to some leading lines of travel, nor to those of a few favored sections, but extends to all with hardly an exception, and is true for those of the East as well as those of the West speaks eloquently for the sound condition of internal commerce.

WORKING THE WASTE DUMPS.—Mr. Leahy, who visited that section day before yesterday, says that about 20 men, Chinese and white, are engaged in working over the waste dumps at this old Allison ranch mine. Some of the pills have previously been worked two or three times, but nevertheless the persons now engaged on them claim to make good wages.—*Nevada Transcript*.

USEFUL INFORMATION.

A New Departure in Color Printing.

A many-colored printing machine has been constructed in Boston for the Forbes Lithograph Manufacturing Company which will be signally efficient in color printing. It is entirely free from the objectionable features of the bed and platen presses, upon which as all practical printers know, it is almost impossible to print good, stiff, body colors from a large surface and remove the sheet quickly from the thins—it being possible only to do it by using thick ink and heavy paper.

By the new press solid colors of many feet square can be printed, even on thin paper, just as easily as the smallest cut. The old operation made it necessary to pass the sheet through the press as often as there were colors to be printed; to wait until each was dry, and to clean the press after each printing, or to use as many presses as there were colors employed, occasioning much delay, or involving the expense of numerous presses with the required pressmen and attendants—all of which has increased the cost to the customer. The new press will print by a continuous operation as many colors as it is designed for, and its scope is not limited in any direction. This important invention will be of immense advantage to the Forbes company in their ability to produce better work; in the saving of the ordinary waste by false registering, and in the rapidity with which they can execute orders where various colors are used.

The Forbes Lithograph Manufacturing Company are also building a bed and platen press which in novelty of construction, rapidity of action and quality of work will surpass any of its kind heretofore made. It will be fed from a continuous roll, and print a number of colors at once.—*Boston Commercial Bulletin*.

A LIGHTNING FLASH.—All the more ordinary effects of "lightning" may easily be reproduced by artificial means, but on a very small scale—how small may be readily inferred from the fact that a three-ft. spark is considered a long one, even from the most powerful machines, while it is quite certain that lightning flashes in the clouds, or from one cloud to another, often exceed a mile in length, and sometimes extend to four, and even five miles. The destructive power of a spark from a machine or from a lightning flash in the clouds is proportioned to the distance over which the spark or flash will move. When a tree is struck by a violent discharge, a large portion of the trunk is usually split into fragments. A more moderate discharge simply ruptures the channels through which the sap flows, and a tree is often thus killed without any visible or external evidences of damage. This result is due to the sudden vaporization of the sap. In this first case the heat is so great and in such volume that the vaporization takes place with the suddenness due to the burning of an explosive compound, and may be illustrated by the violent action produced by pouring melted iron upon so small a quantity as only a few drops of water.—*California*.

PLAN FOR CATCHING THE EXPRESS TRAINS.—M. Hanrez, of Paris, is the author of a method of taking up carriages by a train en route, in order to avoid stopping trains at stations to take passengers up. A "waiting carriage," fitted with a steam engine with a special gear and space for passengers and luggage, is placed on a siding at the station, and picked up by the train as it goes past. The latter, by means of a hook on its last carriage, catches a ring supported on a post, and connected with a cable wound on a drum in the waiting carriage. Thereupon the drum begins to unwind, and in doing so compresses a system of springs, while the carriage is moved at a rate gradually increasing to that of the train. The engines of the carriage then winds in the cable, the train and carriage are connected, passengers are transferred from the joined carriage to the train, and vice versa, then the two are disconnected, [and the engine of the carriage working on the wheels brings it back to the station whence it was taken.

ANNEALING.—It is well known that glass acquires remarkable toughness by being annealed in oil, and that a high degree of hardness is conferred upon metals by a similar process. It is said that engravers and watchmakers of Germany harden their tools in sealing wax. The tool is heated to whiteness and plunged into wax, withdrawn after an instant and plunged in again, the process being repeated until the steel is too cold to enter the wax. The steel is said to become, after this process, almost as hard as the diamond, and, when touched with a little oil or turpentine, the tools are excellent for engraving and also for piercing the hardest metal.

HANGING GARDENS.—To make a hanging garden, take a white sponge of large size and sow it full of rice, hemp, canary, grass, and other seeds. Then place it in a shallow dish, in which a little water is constantly kept, and as the sponge will absorb the moisture, the seeds will begin to sprout before many days. When this has fairly taken place, by means of cords the sponge may be suspended in the window where a little sun will enter. It will thus become a mass of green foliage, and should be refreshed with water daily so as to be kept moist.

SUBSTITUTE FOR RUBBER.—A substitute for rubber, which, while it is cheaper, is elastic and tough, and not injured by high pressure or temperature, is prepared as follows: A quantity of coal-tar oil, or equal parts of coal and wood-tar oil, which is to constitute a third part of the whole mixture, is poured into a large kettle, together with an equal quantity of hump oil, and is heated for several hours, either over steam or an open fire, to a temperature which lies between 252° and 288° F. (it should not exceed the latter), until the mass becomes so ductile that it can be drawn in long threads, and the remaining third, consisting of a quantity of linseed oil which has been thickened by boiling, is then added. With this composition from 5% to 10% of ozokerite and some spermaceti should be mixed. The mass is then heated again for some hours at the same temperature as above, and finally from 7% to 12% of sulphur are added. The mixture thus obtained is cast into forms and treated the same as caoutchouc.

CINCHONA CONSUMPTION.—Those who are alarmed lest the supply of cinchona should run short, will do well to consider the following: Mr. Ferguson, in his "Ceylon Directory," estimates the total consumption of cinchona bark for the world at 12,624,000 lbs. A writer in the *Colombo Observer* says: "I do not think I am over-estimating the number of cinchonas that will be planted in 1880 throughout this island at 20,000,000; allow 5,000,000 for failures and add 5,000,000 for plants planted in previous years and now alive, and it will give you 20,000,000 cinchona trees, which in five years will yield, either by taking strips and mowing, or by the shaving process, about 10,000,000 lbs. of dry bark a year." Mr. Ferguson estimates the production of cinchona bark for the world at 13,471,000 lbs., of which Ceylon is put down for 150,000 lbs.; "hnt when," remarks the correspondent referred to, "it produces 10,000,000, as I believe it will in 1885, the total production of this world will exceed the demand of 1876-78 by 10,847,000 lbs. The question therefore arises, will the demand for the cinchona bark in 1885 equal the supply, or will the bark become unsalable except at unremunerative prices?"

TO PRESERVE WOOD.—Wood that is exposed to the action of water or left into the ground, should first be charred, and then, before it is entirely cooled, be treated with tar until the wood is thoroughly impregnated. The acetic acid and oils contained in the tar are evaporated by the heat, and only the resin left behind, which penetrates the pores of the wood and forms an air-tight and water-proof envelope. Should the posts only be charred without the subsequent treatment with tar, the charcoal formation on the surface would only act as an absorber of the moisture, and, if anything, only hasten the decay.

GOOD HEALTH.

The Bath-room.

[Written for the Press by Mrs. C. F. YOUNG.]

Sisters of the Press family who live in small houses: If the children are uneasy and fretful, if you sometimes are particularly nervous and easily disturbed, just try the soothing effects of a full hot bath early in the morning. An aged person, or an invalid, or infant will relish it best just before going to bed at night as a sedative, snubbing them to sleep better. Followed by a cold dash over the head and a band-width pouring along the length of the spine, it is one of the best known tonics, and should always be taken before breakfast in a warm room. But in California houses the made bath-room is seldom provided. How in a rented house we managed the arrangement of a cosy, comfortable bath-room and kitchen, we wish to tell, and ask you each and all to do likewise.

Our kitchen is a lean-to shed-room (16x12 ft.), 6 inches lower than the porch. Against the house we put two wide shelves—16 inches—one two inches higher than the table; the other five ft. higher, and across the whole width of the 16-ft. room. The top shelf we use for honey frames, boxes, choice bits of lumber, etc., that must be sheltered from sun and rain. Three ft. six inches of the lower shelf has four others above it for dishes. The next two and a half ft. has the flour box (a clean boot-box with corners tinned). The cover is the molding board. The next space (three and a half ft.) has two short shelves above it, making room for cleansed coal-oil cans, with plank covers—one can each for oatmeal, cracked wheat, cornmeal, split peas, beans, rice, tapioca, white and brown sugar. In front of these, about midway the room, is the table. The next eight ft. in width, by five ft. in depth, is piled clear up to the roof with fine split oak stove-wood, as also under the table. All these articles are within two, three and four steps of the stove, which stands at the right of the east door going in, occupying (a No. 7) three ft. of space, the door also three ft., the shelf one ft. and a half, leaving six ft. and a half beyond the stove clear space, by nine in depth for a bath-room. Into this, with our own hands, we set two pans of glass to admit light. We cut a hole at the bottom of the ceiling four by six inches, nailed

three pieces of siding-boards into an open box; one end touched the spring drain on the outside; the other, with this end closed, extended into an empty orange box laid flat side down. Over this we placed a tub, made by sawing off eight inches of the length of a 40-gallon cask; in the bottom, with a two-inch auger, bored a hole; into that fitted a six-inch pine plug; through it bored a three-quarter inch hole; into that fitted a common cork; whittled off the sharp edges of the top of the tub; six and a half ft. from the tub placed a large box cut in half; in it placed, near the top, a shelf; at the end a narrow board, up to the roof; on it a small looking glass, a pin cushion and two books. The cupboard shelf is for towels, sponges and clean garments. The lower part holds a box, a stool and clothes bag; movable rugs are on the floor. The sides of this room are well papered with common newspapers. The children added some pressed leaves, so as to have something pretty to look at while taking a sweat to break up a cold, or to scald and thus kill the poison oak. A thick curtain passes from the stove side to the box, perfectly protecting the bathers and their attendant; a chair and stool and smaller tub for cold water. Hot water, at the pleasure of the bather, can be dipped from the boiler which stands on the hearth, or from a big pan in the oven. By pulling the cork the waste passes off without lifting. Rinse the tub and it is speedily ready for the next one. We do not believe in or like long bath tubs, because of the temptation to lie on one's back in warm or hot water.

The ganglionic nervous system is found along the length of the spine. Heat relaxes the organs to which the ganglia radiates its fibrilla—hence debility and colds experienced by those who take this class of baths. Warm water also relaxes the skin. Very hot water is derivative and a stimulant. Hence, let a person having a headache and cold feet and hands get into my bath-tub, or their own, on their knees, with 15 inches depth of water, as hot as their flesh can possibly bear, bending over, rest the arms in the hot water to the elbows until both arms and feet are red. Then in this hot water frilly wash the whole body, having the room warm; step out, and kneeling by the smaller tub, pour slowly across the forehead, top-head, temples and eyes a gallon of cold water; follow that by a dash along a hand-width of your spine; wipe dry, dress, sit right down to and eat a good breakfast of any relishable good food, and have a clear head and warm feet all day. Follow this up twice a week, and avoid a thousand aches and pains and worries that are fast becoming the rule of the average American woman's life. Boys and girls very soon learn to love these comfortable baths, and volunteer to fill the boiler and lay the wood over night, ready for the touch of a match in the early morning.

The only cost of our bath-room was \$1 for the cask, a half day's extra work and two panes of glass.

During the past three weeks of cool weather persons have come two and a half miles to take a tub sweat to break up a cold, and to learn how to get up the simple arrangement at home—a corner of the kitchen, half of the stove, or one side of it, and the use of the hearth. The disposition and will to have it, and you will make this way without delaying breakfast, or being late to school or work. Try it!

SUBSTITUTE FOR SEA BATHING.—People who have no opportunity to enjoy sea bathing will be glad to know that a substitute, nearly if not quite as strengthening, is found in an ammonia bath. A gill of liquid ammonia in a pail of water makes an invigorating solution, whose delightful effects can only be compared to a plunge in the surf. To weak persons, this is recommended as an incomparable luxury and tonic. It cleanses the skin and stimulates it wonderfully, and leaves the flesh as firm and cool as marble. More than this, the ammonia purifies the body from all odor of perspiration. Those in whom the secretion is unpleasant, will find relief by using a spoonful of the tincture in a basin of water, and washing the armpits with it every morning.

POOR FLOUR.—Dr. Cutter says that the increase of nervous diseases, decaying teeth, premature baldness and general lack of muscular and bone strength are greatly due to the impoverished quality of flour now in use, the gluten being thrown away in order to make the flour white. He urges the use of unboltheaded flour, and of eggs, milk and butter. He denies that fish is brain food, or that Agassiz ever said that it was, and claims that butter, being nearly all fat, is a better kind of brain food than any other.

FRUIT FOR ALL.—Nursing women are often forbidden to eat acids, or acid fruits, lest the milk should turn sour. Vegetable acids, as soon as they are taken up into the blood, are converted into alkaline carbon long before they reach the milk glands, therefore their acidity is destroyed. Instead of being avoided, ripe fruits in moderation are extremely desirable as articles of food for nursing women.

REMEDY FOR CORNS.—Mr. Gezow, a Russian apothecary, recommends the following as a "sure" remedy for corns, stating that it proves effective within a short time, and without causing any pain: Salicylic acid, 30 parts; extract of cannabals indica, 5 parts; colloidion, 240 parts. To be applied by means of a camel's hair pencil.



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G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 27, 1880

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The Week.

At last we have been favored by rain in California. After it had held off for so long as to cause some little alarm and fears of a dry season, showers fell on Tuesday morning early and at 9 P. M. .31 inch had fallen, making a total for the month and season of .32 inch. In 1879, to a corresponding date, .26 inches fell, and in 1878 2.40 inches. Rain was reported in places as far north as Red Bluff and as far south as Visalia.

In accordance with the usual custom, and the proclamation of President and Governor, we devote one day on this week to Thanksgiving. California can well afford to do this, for the past year gave her a most abundant wheat crop, a good grape harvest, and a generous yield of gold. True, her manufacturing interests flag a little, but they are as yet comparatively small. More attention is now being turned to them, however.

A noticeable event in the week has been the conclusion of a treaty with China, the terms of which are referred to elsewhere in this number of the PRESS. From the mines no news of special moment is stirring. The Imperial mine, on the Comstock, caught fire this week, but the fire has been happily extinguished. A more serious question is that of the water. The Yellow Jacket group of mines will be partly flooded till the Jacket pumps are ready to start up again.

The total coinage of standard silver dollars under the act of February 25th, 1878, has been \$72,847,758. Of this, \$47,588,106 are in the Treasury and in the Mints, and \$25,259,644 in circulation.

The Richmond Con. mine is turning out about \$25,000 per week.

For the week ending on the 5th, the bullion

Our Coal.

Coal, at any time, is a very important substance in the economies of civilization, but when at normal prices the majority of people seldom think of it, taking it as a necessity that comes like anything else. When, however, from any cause, either lack of supply, high transportation, or "corners," its price rises suddenly, then the people begin to think something about it—where it comes from; how it is obtained, and why they have to pay higher rates at one time than another.

On this coast we are peculiarly situated as to coal. In fact, nature seems to have slighted us in this respect. On the eastern coast of North America coal is most abundant, and not only abundant in quantity, but excellent in quality. Here we have mines of gold, silver, copper, and, in fact, almost everything except coal. Of course we have some coal, but the fields of the western coast of North America are limited in extent. Mr. Goodyear, formerly of the State Geological Survey, tells us that our beds are of comparatively recent geological origin. They are none of them of the carboniferous age, and, indeed, so far as yet known, none of them date back of the cretaceous period.

The beds mostly furnish a non-caking bituminous coal, which belongs to the class of lignites, or brown coal. Vancouver's Island, however, produces caking coal; and some caking coal of good quality has also been found in Washington Territory; but no workable mine of anthracite has ever been discovered on this coast, and the little that has been found, has proved on investigation to have been the result of local and special metamorphism.

Of the two States and one Territory which border on the Pacific coast between Mexico and British Columbia, Washington Territory is by far the most liberally supplied with coal. Oregon comes next and California last.

In fact, California is decidedly unfortunate in the extent and character of her coal fields. For, although it is easy to find coal at many localities in the Coast range from one end to the other, as well as at certain points in the western foothills of the Sierra, yet it generally happens either that its quality is poor or the quantity is small, or else that it is situated in the heart of the mountains, so far from market that the cost of transportation alone would far exceed the value of the coal.

Our Mt. Diablo coal, which is mainly used for steam coal in this city and on the steamers of the bay, is of poor quality, and, owing to its sulphur, is disliked for domestic purposes.

The Coos Bay coal field covers several hundred miles of territory, stretching from the Umpqua river on the north to points beyond the Coquille river on the south, and extending back from the coast to from 15 to 20 miles interior. The country is covered with a heavy growth of timber. The coal to be mined at a profit must be of good quality, favorably situated for cheap mining and very close to navigable waters.

The coal mines of Washington Territory are situated at Bellingham Bay close to the British Columbia line, and in the vicinity of Seattle on the eastern shore of Puget sound. The Seattle coal field is one of the most important on the coast, and covers a large area. Some of the best coal on this coast comes from Nanaimo, British Columbia or Vancouver Island. Our Wellington coal comes from here, and is considered a first class coal. The Rocky mountain coal fields in view of the present scarcity of coal are to be worked more energetically. The Central Pacific Railroad Company are soon to send on an additional 40 car loads per day, beside the 60 car loads already being sent. About 100 miners left Virginia city on Sunday to go to these mines. Men are not hired by the day or month, but are paid in accordance with the amount of work they do. They receive 74 cents per ton for cutting down the coal, the company then taking it and hauling it out of the mine.

The importers of coal in this city say that the rise in the price can be attributed only to one fact—the scarcity. The supply is less, they say, by 200,000 tons, than is usual at this season of the year. This is owing to the extension of the Southern Pacific railroad and the difficulty of getting ships to carry coal to this market. The Seattle Coal Company, it is said, is behind 20,000 tons with its contract with the railroad company. Some of the prominent coal dealers on being interviewed deny the existence of any corner. They say there is no combination among the wholesale dealers to make a corner and force up the price of coal. The rise was simply the effect of an inefficient supply and the great advance in freight of \$4 and \$5 per ton. Indeed, freightage was difficult to be obtained at any price, and it was more than probable that another rise of a dollar or two on a ton would soon be a necessity. Instead of this condition of things being an advantage to the wholesale dealers, it was the reverse of that. The quantity of coal now on the way here is said to have been greatly exaggerated. We are told, moreover, that there is little chance of any lowering of price for some months to come.

One good thing about this rise is that we shall soon have steam colliers. Arrangements are being made to build one already. This would be a good use to put some of the big steamers lying idle in the bay, as out of date for passenger service.

would not only prove a great benefit by reducing the prices paid by household consumers, but would be a great advantage to manufacturing enterprises.

Weekly Mining Reports.

Mining superintendents in this State should recollect that there is a law requiring them to make out every week a sworn statement as to the state of the mine, etc., and requiring the trustees to make out a monthly sworn statement of receipts and expenditures. The penalty for non-conformity with the law is a fine of \$1,000. There have been several suits of late for neglect to comply with the provisions of the law, and any company is liable to get into trouble if any stockholder chooses to make trouble. As the law reads it makes no difference whether the mine is worked or not. As there has been so many apparent evasions or so much neglect of this law of late it will be well for superintendents and trustees to bear its provisions in mind. We therefore give the full text of the bill as it finally passed the legislature and was signed by the Governor. It is as follows:

SEC. 1. It shall be the duty of the secretary of every corporation formed under the laws of this State for the purpose of mining, to keep a complete set of books, showing all receipts and expenditures of such corporation, the sources of such receipts and the object of such expenditures, and also all transfers of stock. All books and papers shall at all times during business hours be open to the inspection of any bona fide stockholder; and if any stockholder shall at any time so request, it shall be the duty of the secretary to attend at the office of said company at least one hour in the day out of regular business hours, and exhibit such books and papers of the company as such stockholder may desire, who shall be entitled to be accompanied by an expert; and he shall also be entitled to make copies or extracts from any such books or papers. It shall be the duty of the directors on the first Monday of each and every month, to cause to be made an itemized account or balance sheet for the previous month, embracing a full and complete statement of all disbursements and receipts, showing from what sources such receipts were derived, and for what and to whom such disbursements or payments were made, and for what object or purpose the same were made; also, all indebtedness or liabilities incurred or existing at the time, and for what the same were incurred, and the balance of money, if any, on hand. Such account or balance sheet shall be verified under oath by the president and secretary, and posted in some conspicuous place in the office of the company. It shall be the duty of the superintendent, on the first Monday of each month, to file with the secretary an itemized account, verified under oath, showing all receipts and disbursements made by him for the previous month, and for what said disbursements were made. It shall also be the duty of the superintendent to file with the secretary a weekly statement, under oath, showing the number of men employed under him, and for what purpose, and the rate of wages paid to each one. He shall attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, and from what part of the mine taken, the amount sent to mill for reduction, its assay value, the amount of bullion received, the amount of bullion shipped to the office of the company or elsewhere, and the amount, if any, retained by the superintendent. It shall also be his duty to forward to the office of the company a full report, under oath, of all discoveries of ore or mineral-bearing quartz made in said mine; whether by boring, drifting, sinking or otherwise, together with the assay value thereof. All accounts, reports and correspondence from the superintendent shall be kept in some conspicuous place in the office of said company, and be open to the inspection of all stockholders.

SEC. 2. Any bona fide stockholder of a corporation formed under the laws of this State for the purpose of mining, shall be entitled to visit, accompanied by his expert, and examine the mine or mines owned by such corporation, and every part thereof, at any time he may see fit to make such visit and examination; and when such stockholder shall make application to the president of such corporation, he shall immediately cause the secretary thereof to deliver to such applicant an order, under the seal of the corporation, directed to the superintendent, commanding him to show and exhibit each part of said mine or mines as the party named in said order may desire to visit and examine. It shall be the duty of the superintendent, on receiving such order, to furnish such stockholder every facility for making a full and complete inspection of said mine or mines, and of the workings therein. It shall be his duty also to accompany said stockholder, either in person, or to furnish some person familiar with said mine or mines to accompany him in his visit to and through each mine or mines, and every part thereof. In case of the failure or refusal of the superintendent to obey such order, such stockholder shall be entitled to recover in any court of competent jurisdiction against such corporation the sum of \$1,000, and traveling expenses to and from said mine as liquidated damages, together with costs of suit. In case of such refusal it shall be the duty of the directors of such corporation forthwith to remove the officer so refusing, and thereafter he shall not be employed directly or indirectly by such corporation.

SEC. 3. In case of the refusal or neglect of the president to cause to be issued by the secretary the order in the second section of this act mentioned, such stockholder shall be entitled to recover against said president the sum of \$1,000 and costs, as provided in the last section. In case of the failure of the directors to have the reports and accounts current made and posted as in the first section of this act provided, they shall be liable, either severally or jointly, to an action by any stockholder in any court of competent jurisdiction complaining thereof, and on proof of such refusal or failure, such complaining stockholder shall recover judgment for \$1,000 liquidated damages, with costs of suit.

SEC. 4. All acts and parts of acts so far as they do conflict with this act are hereby repealed.

SEC. 5. This act shall take effect from and after its passage.

Water in the Comstock.

The water in the deep Comstock mines has always been the worst feature they have had to contend with. The expense of constructing and operating the pumping machinery has been enormous, and it has been in many instances the cause of assessment after assessment. In fact it is the greatest of the great expenses of mining up there. It has been all they could do a great deal of the time to keep some of the more prominent mines free, working as rapidly as possible with the pumps, and whenever an accident of any kind occurs to the pumping machinery the water gains so fast that the lower levels are flooded and great damage is done; and the flooding of one means the flooding of others in the same group where the water flow is very heavy. A case of this kind has just occurred on the Comstock. Last week the Yellow Jacket pumping machinery became disabled, and the pumps had to stop. They set two baling tanks to work, which had a combined capacity of 2,400 gallons, and hoisted about 266,700 gallons of water in 24 hours. These tanks were run at utmost speed, but the work was very hard on the cables, breaking the wires used in sawing between the strands. This had therefore to be stopped. The Belcher and Imperial pumps were set at work. The Enterprise is of the opinion, however, that there is too much water in the Jacket group of mines to be handled by all the pumping power that can be brought at present to bear upon it. A meeting of the different superintendents was held, and the prevailing opinion is that economy and good judgment demand that the expensive baling and pumping be stopped. The Gold Hill News says there is talk moreover of stopping all these operations until connection is made between the Jacket and the south lateral of the Sutro tunnel. This branch will be up to the Jacket, at all events, about March. The connection could be made by working both ways in about two and one-half months. It will take about two months to rig the Jacket up again. The talk now is of starting in on the Jacket and running north on the tunnel level with all speed, making the connection as quickly as possible, dropping the Jacket upper pumps, completing the double column from water line to that level and, when another attack is made on the water with these advantages, it could be easily and quickly conquered. That connection would be of benefit to the mines by means of connections as far south as the Caledonia.

The stopping of the tanks at the Jacket is virtually the abandonment of the lower levels of the Exchequer, Alpha, Con. Imperial, Confidence, Kentuck, Crown Point and Belcher to the flood and the stopping of all prospecting in these mines for a month or more, probably considerable more.

Concerning the situation the News says: "This pumping and baling is very expensive business. The Jacket has been consuming 27 cords of wood per day, and besides running pumping engines it takes a great deal of compressed air at the Con. Imperial and Point and Belcher to run donkey pumps to raise water to higher levels where it can be got rid of by sending it to other pumps. Then the mines will only be delayed and not injured by allowing the water to come in and remain till the Jacket completes its repairs. It is a risky business—this pumping steadily for a month or two with the certainty that if, as is almost probable, just before the end of that period should an accident occur to some of the machinery or rods all the work and expense will be lost. It is not probable that the water, if given its way, will raise very high. Con. Imperial has a head at the 2000 level, but will take care of that itself in any event. The 2400 of that mine is dry and only a little water is found on the 2600. Exchequer has, on the 2800 level, about 8 inches of it. It is not probable, therefore, that it would come above the 2500 of that mine, as the influx from other mines is low down."

The Enterprise is of about the same opinion, saying that when the Jacket tanks are stopped it will be useless for the Belcher and other companies to pump, and it will really be better for stockholders and all concerned to let the water come up to its level and stand there until the Jacket pumps are ready to start up again. Working as they have been doing, they might have been able to reduce the water sufficiently to allow of something being done on the lower levels, but the breaking of a pump rod would, at any time, result in a loss of all

The Treaty With China.

The "Chinese question," which, to a certain extent was considered a local matter before the recent campaign, was, during that epoch, brought so prominently before the people of the United States, that it has become national.

On this coast, however, where it has been from force of circumstances more prominently brought forward before the people, it is better understood than in the East. When, therefore, United States Commissioners were appointed to revise the treaty with the government of China, the population of the Pacific coast was more deeply interested than others.

The telegraph now brings us news that a treaty has been concluded with China. While the text of the new treaty will not reach our Government for a month yet, the Department of State has received enough by telegraph to indicate its nature. Until ratified the treaty cannot be made public. It is understood that this document does not change the status of American citizens in China, nor does it enter into the commercial features covered by the Reed treaty of 1858. It is a modification of the Burlingame treaty, and is in accordance with Evarts' policy, restraining further immigration of Chinese to this country, while at the same time not going to the extreme of sending those back who are already here. It is understood that the treaty provides that no master of any vessel owned in whole or in part by a citizen of the United States, or of any foreign country, shall take on board from any port in the Chinese Empire, or other foreign ports, any number of Chinese passengers, male or female, in excess of the number of 15, to bring them within the jurisdiction of the United States. Any master of a vessel who violates this clause of the treaty shall be considered guilty of misdemeanor, and subject to penalties to be provided for in the way of fine and imprisonment. It further stipulates that the master of any vessel arriving in the United States from any foreign place shall be required to furnish to the collector of the district in which he arrives a separate list of all Chinese passengers on board his vessel. This list shall be sworn to, and any evasion or misrepresentation under this stipulation shall also be considered a misdemeanor. The fines imposed upon the masters are to be considered liens upon their vessels. The provisions of the present statutes forbidding importation of coolies and women for immoral purposes are not affected by the treaty. No Consul or consular agent of the United States can grant a certificate to any vessel leaving China for this country if she has on board more than 15 Chinese passengers. Of course it is explicitly stated that the limitations do not apply to persons officially connected with the Chinese government, or to persons rescued from shipwreck. This treaty will undoubtedly be ratified at an early day by the Senate, and will be a measure to satisfy all but the most extreme of the anti-Chinese element on the Pacific coast. The treaty itself is a modification of articles 5 and 6 of the Burlingame treaty, which read as follows:

Article V.—The United States of America and the Emperor of China cordially recognize the inherent and inalienable right of man to change his home and allegiance, and also the mutual advantage of the free migration and emigration of their citizens and subjects respectively from the one country to the other, for the purpose of curiosity, of trade, or as permanent residents. The high contracting parties therefore join in reprobating any other than an entirely voluntary emigration for these purposes. They consequently agree to pass laws making it a penal offense for a citizen of the United States or Chinese subject to take Chinese subjects either to the United States or any other foreign country, or for a Chinese subject or citizen of the United States to take citizens of the United States to China or to any other foreign country, without their free and voluntary consent, respectively.

Article VI.—Citizens of the United States visiting or residing in China shall enjoy the same privileges, immunities or exemptions in respect to travel or residence as may there be enjoyed by the citizens or subjects of the most favored nation, and reciprocally, Chinese subjects visiting or residing in the United States shall enjoy the same privileges, immunities and exemption in respect to travel or residence as may there be enjoyed by the citizens or subjects of the most favored nation. But nothing herein contained shall be held to confer naturalization upon citizens of the United States in China, nor upon the subjects of China in the United States.

GEN. SCHOFIELD has asked to be relieved from the command of the Department of West Point. There is talk of assigning Gen. Miles there instead of to the Signal Service.

Scenes in Alaska.

In our last issue we made some remarks concerning the mines of Alaska. There is little doubt that in the broad area of the Territory yet to be prospected mining ground will be discovered. Certain parts of the country have been prospected, but by far the greater area has never been examined. The proposed expedition to the upper part of the Yukon river next season may develop something. Alaska is by no means the mass of snow and ice many people imagine. There is more or less rain, but the summers are pleasant, and the winters, at Sitka at least, are by no means extremely cold. There are other parts of the United States every bit as cold and colder. Until last winter the "oldest inhabitant" of Sitka had never known the thermometer to record more than

looks the bay from a fine elevation. Sitka is the principal, and, in fact, only town of any importance in Alaska.

GRASS VALLEY MINING DISTRICT.—The Union gives its usual monthly review of mines in that district. It mentions 14 quartz properties, including all the better known ones. In the list are the following mines that are producing ore regularly: Idaho, New York Hill, Rocky Bar, Sebastopol, Empire, Alpha and Ford & McDonald. There are several important prospecting enterprises under way, most of which are likely to yield good results hereafter. As a preface to its description, the Union observes: There are at the present time more prospecting companies at work and more mines working under regular system than at any time within the past six or eight years. This mining is mainly being carried on by our own people, as a legitimate industry, with no view to speculative purposes or to get up wildcat schemes to float on

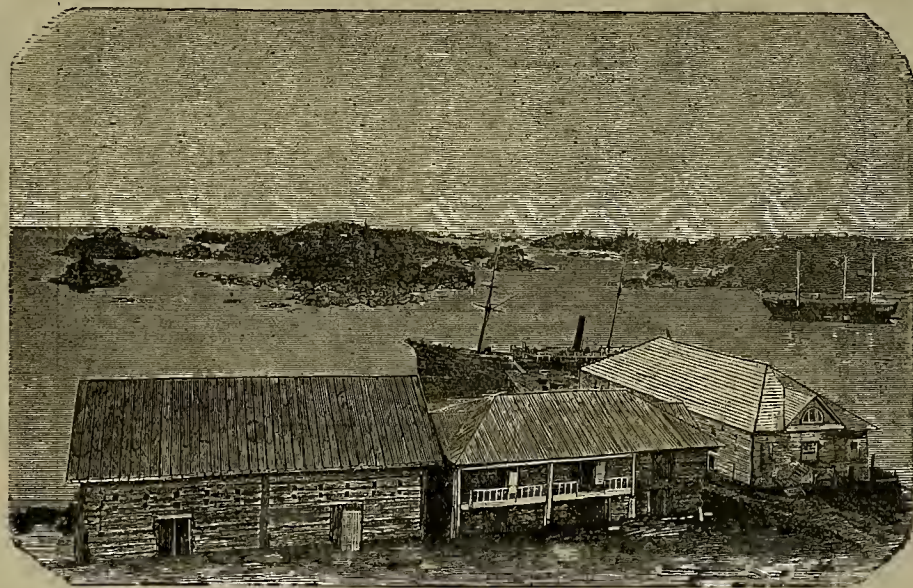


SITKA, ALASKA TERRITORY.

four degrees below. Last winter it recorded twelve degrees below.

Our new Territory at the north is just now attracting more attention than ever before because of its varied resources and wonderful scenery. It is a country of wonderful forests and rare floral growths. It is the abode of living glaciers which are continually shunting off icebergs. The waters are almost alive with fish,

San Francisco or Eastern markets. It has always been a marked feature of mining at Grass Valley that it has been mainly conducted by home capital and by home miners, and but little effort even made to induce outside capital to come in. It is an interesting historical fact that the first discovery of gold in quartz was made in this district, and the first quartz mining and milling was done here. That was in the



A VIEW OF THE BAY OF SITKA.

and the land is disclosing much mineral wealth. In short, it is a most interesting possession, and one which will ere long be much better known to our people. The literature of Alaska is soon to be enriched by the new book by E. Conklin, entitled *Picturesque Northwest*, in which considerable space is given to facts and pictures of Alaskan resources and scenes. This work is soon to be published by the Continent Stereoscopic Co., of New York. In advance of publication, we have secured the right to reproduce some of the engravings, from which we give a selection on this page.

The Bay of Sitka is a beautiful body of water—studded with islands in most picturesque arrangement, which leads the eye well out upon the northern sea until the waters are lost in the horizon, end sea and sky commingle. We have visions of a Grecian Archipelago and an Italian sunset. Everyone who has ever visited Sitka admires its bay. It is very well protected on all sides, and its many islands give it a picturesque character. The town of Sitka over-

year 1850, and from that time until the present, gold quartz mining has been the chief industry and maintenance of the district.

THE STATE MUSEUM.—Mr. Henry G. Hanks, our efficient State Mineralogist, is busy preparing a report for the Governor and Legislature, which will contain a great deal of interest to the mining community. Among other things there will be a history of mining in California. The salary paid in the office of the Bureau at present are, State Mineralogist, \$3,000 per year; Secretary, \$150 per month; Chemist, \$125 per month; Janitor, \$75 per month. The museum contains 40 glass cases with 2,000 classified specimens.

SIXTY THOUSAND immigrants arrived at the leading ports of the U. S. during October, and despite the Irish troubles, nearly a thousand more English than Irish came, and three times as many Germans as Irish.

Labor in San Francisco.

San Francisco is peculiarly situated as respects its labor market. Being the only large city on the coast, the terminus of railway and steamship systems, it is continually receiving accessions to the number of unemployed laborers. People from the country send to the city for "help," and the "help" comes to the city when they want employment in the country. Again, whenever there is any dull times in the interior, those persons without permanent occupations come, when they can, to the city to find work. The men who have, during the summer, made a "stake" working in the fields, in the mines, or in the timber, come to the city to spend their earnings. These spent, they again join the army of the unemployed. It was only the other day we heard of 50 or 60 men engaging to go to Arizona to work for a dollar a day. These men of course accepted such wages only from necessity, and in order to have something to do. They were no doubt men who had been long waiting for jobs. The winter months usually bring numbers of laboring people to the city. We have, therefore, to take care of or look out for a very large proportion of unemployed people who do not really belong in San Francisco, but who are better off here than in small country towns.

It is to be hoped that not many years will elapse before we have a better system of small farms than now seems possible. When this happens there will be fewer of these floating laborers. Another thing we sadly need, is the formation of manufacturing establishments in our interior towns, so that they will get a class of people who have more permanent employment than harvesting gives.

We are led to these remarks by reading the report of the *Free Labor Exchange* of this city. The manager, Mr. G. W. Schroeder, says: "The great stagnation of business during the winter months, with corresponding lack of demand for help in the male department, was followed by an unusual demand for help during the whole summer, principally for farm hands and day laborers. The demand for such help

has been generally in excess of the supply, standing orders for 70 and 80 farmers being kept up for several weeks without being filled. There has consequently been an increase of over 50% in the orders and engagements this year, as compared with last."

This illustrates our greatest difficulty. That is, we are short of laborers in the summer, and have more than we want in winter, and this the city feels more than the country.

In referring to female help, the report above alluded to says: "The demand has always been for twice as many girls as could suitably fill the orders. Every one, young or old, who was willing to assist in housework or take care of children, could always get \$10 a month and board. For nearly all occupations in this department, the demand continues for young, neat and reliable girls with references." Caro is taken in the selection of competent and sober help. The following is the summary of transactions for the year:

Male Department.—Number of orders received, 1,119; number of persons called for, 1,750; number of persons engaged, 1,270. Nationalities—Irish, 383; English and Scotch, 38; Scandinavians, 26; Americans, 545; German, 141; various nations, 137. Occupations—Laborers, 370; farmers, 131; carpenters, 55; cooks, 41; waiters, 60; dishwashers, 64; general usefulness, 108; boys, 83; various occupations, 358.

Female Department.—Number of orders received, 2,387; number of persons called for, 2,507; number of persons engaged, 1,213. Nationalities—Irish, 515; Americans, 456; English and Scotch, 24; Germans, 47; Scandinavians, 22; other nations, 149. Occupations—Nurse girls, 156; assistants, 180; chambermaids and waitresses, 49; cooks, 24; general house work, 613; various occupations, 191.

Total number engaged in both departments, 2,483. Total number of persons engaged during the three years, 8,038.

RIVETED CLOTHING PATENT.—In the case of Levi Strauss & Co., of San Francisco; vs. H. W. King & Co., of Chicago, for infringing plaintiff's patent on riveted clothing, Judge Blatchford has entered a final decree giving plaintiff a perpetual injunction and \$30,000 damages. We gave the full text of the decision in favor of Levi Strauss & Co. when it was rendered. The original patent for this riveted clothing was procured through the agency of Dewey & Co., publishers of this journal, and we feel pleased to see that it has stood the test of the Courts so thoroughly.

SIERRA BUTTES QUARTZ COMPANY, Sierra county, are working 190 men, and have two mills constantly crushing rich quartz.

Cotton Growing.

This year's experience with cotton growing in the upper San Joaquin valley will in all probability lead to a wider planting next year. There has been talk about the immediate erection of cotton mills by the capitalists upon whose lands in Kern county there was a satisfactory test crop grown this year, but these rumors are premature and are repudiated by the men who have been credited with the intention to manufacture. It is too soon to build cotton mills in this State, for the product is not yet large enough. It is probable that our woolen mills will need all the cotton that can be grown here for a year or two to incorporate in their "all-wool" fabrics, and, so long as the local demand takes the crop, it is not likely that growers will be restless to test the problem of manufacturing. It is, however, quite likely that, if growing proceeds, there will be an introduction of the new style of cheap cotton mill, which, by the use of the Clement attachment wheel, we described some months ago, will work the material into thread directly from the boll.

The great cotton interest of the United States seems to be in quite a prosperous condition and production has increased so that ante-war figures are largely exceeded. It is stated by Eastern authorities that the 15 crops since the war were greater than the 15 crops before the war by 9,500,000 bales, worth fully \$600,000,000. The crop of 1880 promises to be one quarter greater than any crop before the war. This item of progress and prosperity in the South must be gratifying to all lovers of the country. It is to be expected that the volume of the new census which will treat of cotton production will bring to light a vast amount of information which will serve the whole growing industry.

It does not appear that the wealth produced by the cotton plant is at all adequately realized, but that immense wastes occur which, in part at least, may ere long be turned to good account. The cotton growing industry as it might be is shown by Edward Atkinson, of Boston, as follows:

The present power of King Cotton is but the shadow of the substance yet to come. The value of the seed is yet an unknown quantity. It may seem almost the work of a visionary to compute it. If we make 6,000,000 bales of cotton fiber in a year, the weight of cotton-seed that will remain after enough has been set aside for the next year's planting will be 3,000,000 tons. If the whole of this seed be treated as a small portion is now treated, this seed will give the following results: About 90,000,000 gallons of oil, about 1,300,000 tons of oilcake or meal, about 1,500,000 tons of hulls, from which there is every reason to suppose from experiments here, and actual use elsewhere, that 750,000 tons of paper may be made. Otherwise these hulls ground into meal with the oilcake will serve as food for stock—2,800,000 tons in all. Each ton of this ground meal would carry at least five sheep six months, the rest of the year they would have ample food from the annual grasses that are the pest of the cotton planter, or from corn-fodder, cow-peas, or other refuse or alternate crops. The waste of the cotton gin, and of the oil press, with other waste of the cotton farm, will, therefore, suffice for not less than 14,000,000 to 20,000,000 sheep, probably for double that number. These sheep, folded upon the cotton fields, would so fertilize the soil as to double the crop of cotton on any given acre of uplands—the manure of animals fed on cotton-seed meal being richer than that from any other known variety of food.

Mr. Atkinson suggests that there be held at some future time a grand exhibition of the products of the cotton plant and the machinery employed in their preparation and manufacture. The suggestion is a good one and it would seem fitting to fix upon the New York world's fair of 1883 as the proper occasion. By that time the present cotton experiments of California will have reached some results and if favorable it will be a good opportunity to show our cotton to the world.

Exploring a Big Cave for Wealth.

The mining claim known as the Park County, located on Twelve-Mile creek, two miles this side of Platte station, has been the scene of a truly remarkable subterranean development. Messrs. Bergh & Stark own the claim and have been exploring an immense body of iron that was discovered during the Platte station excitement of last summer, in the hope of striking a hedy of pay mineral. One day last week a shot put off in the bottom of the shaft, at 80 ft. from the surface, revealed the opening of a large cave. Immediate arrangements were made to explore it, and it is now ascertained that the cavern is of great extent and wonderful beauty in parts. It is in the form of a tunnel varying in width from 2 to 10 ft. The roof sometimes hangs so low as to compel a stooping position on the part of the explorer and again stretches up to a vast height, so that a candle held high over the head does not reveal the roof. When it can be seen, beautiful stalactites cover it and give back brilliantly reflected lights. The distance along this subterranean cavern has been determined, by actual traversing, to be not less than 175 ft., while several small apertures leading off from it indicate more caves beyond the points that are of easy access. Openings will be made in order to see if such do not exist. Of course, aside from the curious points of this unexpected discovery, there rests in the minds of the owners a hope that it will lead to the finding of mineral beds. So far, the most careful search has failed to reveal more than slender indications of mineral, but it will be carried on until no doubt of its presence or absence remains.—*Fairplay (Col.) Flume.*

For the week ending Nov. 12th, the bullion shipment from Salt Lake amounted to \$161,640.

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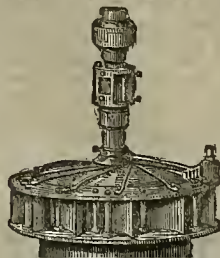
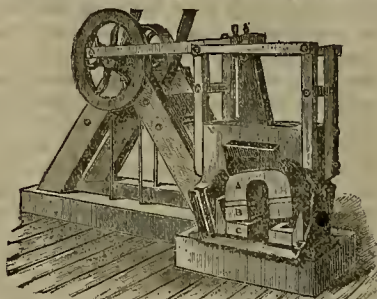
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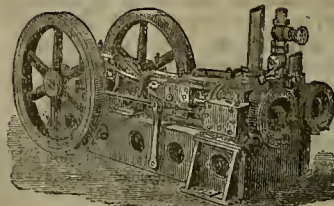
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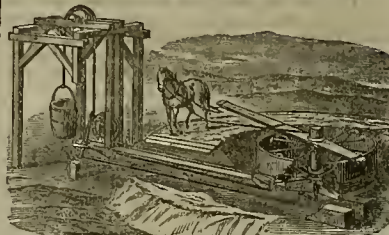
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the great lode in this city with a copy of the book for their
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

The following Canadian patents have been issued to Pacific Coast inventors.

11,437.—COLLAPSIBLE VALVE.—Wm. Wilson, Oakland, Cal.
11,605.—FIBER DECORATOR.—Thomas Threlfall, S. F.
11,704.—BARK PANS.—Charles Jackson, S. F.
11,780.—ROCK DRILL.—H. Richmann and U. K. Arnold, S. F.

11,816.—EXPLOSIVE COMPOUND.—A. Munnir, S. F.
Notes.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions* rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

Miller et al., vs. Smith et al.

United States Circuit Court, District of Rhode Island. Decided October 7, 1880. Clifford, J.:

1. The introduction in evidence of letters patent affords a *prima facie* presumption that the patentees is the first and original inventor, and is sufficient to entitle the complainants to a decree, unless it is overcome by competent proof of greater weight.

2. Regulations and provisions applicable to the obtaining or prohibition of patents for inventions or discoveries, not inconsistent with the existing Patent Act, apply to patents for designs, without modification or variation.

3. Exhibits introduced by a party without needful explanation, do not deserve, and will not receive much consideration.

4. When the defense of want of novelty is made, it is the duty of the tribunal, whether court or jury, to give it effect; but such proof or testimony, should be weighed with care, and never be allowed to prevail where it is unsatisfactory, nor unless its probative force is sufficient to outweigh the *prima facie* presumption arising from the introduction of the patent.

5. In the case of a design, as well as a mechanical patent, mere delay in applying for a patent will not forfeit the inventor's right to the same, or present any bar to a subsequent application, providing the invention had not been in public use or on sale two years before the filing of the application.

6. A patent for a design, consisting of letters of the alphabet having a described ornamentation is not bad because it embraces more than one letter.

7. While it is true that the test of infringement in respect to the claim in a design patent is the same as in respect to a mechanical patent, it is not essential to the identity of the design that it should be the same to this eye of an expert.

8. If to the eye of the ordinary purchaser the designs are substantially the same, if the resemblance is such as to deceive such an observer, and sufficient to induce him to purchase one, supposing it to be the other, the one first patented is infringed by the other.

Decree for complainants.

COMMISSIONER'S DECISIONS.

Brown vs. La Dow.

Appeal from Examiners-in-Chief. Decided October 23, 1880. Marble, Comr.:

1. Under the statutes and rules the only question presented to the Board of Examiners-in-Chief on an appeal from the Examiner of Infringements, in which the parties to the controversy is the prior inventor.

2. The Board, by undertaking in its decision to show that the inventions declared to be in interference were not the same, and treating the issue between the parties as a "fictitious one," and rendering a decision on such alleged fictitious issue, exceeded its jurisdiction.

3. The question of interference had been twice before the Commissioner on motion, and each time decided affirmatively, and the Board was guilty of an impropriety in thus re-opening the question in its decision.

4. If the Board, upon an examination of a case, is of the opinion that the devices do not interfere, it is its duty, under rule 134, to call attention to that fact, by a statement annexed to its decision, not a part of it.

5. It is sufficient always for an appellate tribunal to consider the questions before it in the form presented by the appeal, and although the Commissioner and Board may look beyond the questions so raised in considering the case, still no decision affecting the rights of the parties can be made upon any question not involved by such appeal.

6. If reasons are discovered by the appellate tribunal, showing *prima facie* that a patent ought not to issue, this case must be returned to the Primary Examiner for his consideration, and the party to be affected thereby must have an opportunity to show if he can, why such reasons should not operate against him.

7. Where the rules of practice have been clearly indicated and determined, there is no reason why any officer of the bureau should fail to observe them.

The decision of the Board is overruled and priority of invention awarded to Brown.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

BOOK HOLDER.—Wm. B. Dangharty, Carson City, Nev. Patented Nov. 16, 1880. No. 234,460. This invention relates to a novel device for holding an open book, the device being hung from the shoulders of the reader in such a manner as to have the book in proper place for reading, allowing the reader to assume any position he may desire, and leaving his arms and hands free. It consists of a base upon which the book rests, and from the sides of this base are two curved arms which are so formed as to hook over the shoulders of the reader, and are properly braced to hold the base in the same relative position, whether the reader is in a sitting, standing or reclining position. This device is very convenient, as the reader may have his hands free for writing or other occupation, and

THILL COUPLING.—Levi B. Lathrop, Hollister, California. Patented Nov. 16, 1880. No. 234,591. This device consists in certain details of construction, combined with an independent holding-seat or plate, within which an elastic block may be supported beneath the joint which unites the thill or pole to the vehicle to prevent rattling. This independent seat is provided with a V-shaped projection from its lower surface, which fits into a corresponding groove in the clip-bar, the front end of which is extended out beneath the seat so as to support it, and so that when the rubber becomes worn, the seat and rubber may be raised to make a close fit, by screwing up the nut upon the front clip-bolt without other device or attachment.

HAY PRESS.—Ben. W. Watts, Los Angeles, Cal. Patented Nov. 16, 1880. No. 234,509. The improvements herein made consist in certain details of construction by which the power is applied to the follower for pressing the hay while the press is traveling from one cock to another, avoiding the necessity of unhitching the team when pressing a bale; and there is also an improved means of preventing lateral spreading of the body by the bar which controls the corners. By this construction a hay may be pressed while traveling from one cock to the other, and it is never necessary to unhitch the horses and connect them to a hall-wheel rope.

Wood Getting Scarce.

While we are grumbling here at the rise in price of coal, people in other parts of the States and in Nevada are likely to join us about their fuel—wood. We not ice that in Eureka, Nevada, it is currently reported among the charcoal men that the over-supply is running short, and that a better price than 22 cents per bushel is to be looked for shortly. Partis largely interested in that line of business say that there is not enough manufactured on this ranches to supply the demand for the furnaces this winter, and very little will be made unless the price comes up to 30 cents per bushel. This will reduce profits in the mines to some extent, of course. It is not only there that this rise is occurring. The cost of wood along the line of the railroad on the eastern and western slopes of the Sierra has increased 10% the past year, and the prospect is that it will increase as much more the coming year. The Truckee Republican says: Every acre of timbered land in this region that is accessible, in the hands of the Government or railroad company, is worth all that is asked for it, and must increase in value every year hereafter, as long as the timber remains uncut. There is no safer or better investment than in timber lands. The people are availing themselves of this opportunity and thousands of acres are being taken up every year. The day is not far distant when the forests will be considered much more valuable than they are now.

BARBEE & WALKER.—The Barbee & Walker mine is one of those in the "sandstone district" of Silver Reef, Utah. It has now been for some time steadily shipping bullion, which is the best proof of what it is. The mine is owned by a New York company, but several Californians are interested. At a stockholders' meeting, held in New York recently, the following trustees were elected: Milton S. Latham, Elisha Riggs, William R. Garrison, J. Boorman Johnston and De Lacy Loucks. At a subsequent meeting of the trustees, Milton S. Latham was elected President; Elisha Riggs, Vice-President; the Mining Trust Company, Treasurer; De Lacy Loucks, Secretary, and R. L. Ogden, Superintendent. The latter is well known in this city, where he was formerly manager of the Kimball Carriage Works. We know of his having put a good deal of money into mines at different times, and are glad to see that he is now taking some out, for a change.

THE DODGE CONCENTRATOR.—The new concentrator invented by Mr. Miles B. Dodge is still doing very good work. The following result of the working of some highly sulphureted rock from Hornitos will serve as an example of its usefulness. The ore averaged \$12.55 per ton. A batch of 500 lbs. of this ore was worked which contained according to assay \$2.42 in gold. From this 634 lbs. of sulphurets was obtained, containing \$2.43. The tailings only showed traces. This is according to Kustel & Rott's assay. Numbers of people are witnessing the work of this machine at 143 Fremont street, every day.

ORE FEEDERS.—Joshua Hendy, manufacturer of ore feeders, has, in the last 90 days, sold 87 Challenge ore feeders, and some few of other makes. Many of these feeders were ordered to take the place of feeders of other manufacturers. This is an evidence of the appreciation of the Challenge, and an indication of the widespread use of mechanical ore feeders.

THE Homestake mining company has declared the usual dividend of 30 cents per share, and one extra dividend of the same amount, both payable at New York on the 26th. This is the third extra dividend in the past three months. In the past two years 26 dividends have been

CENTRAL PACIFIC EARNINGS.—The earnings of the Central Pacific Railroad Company for October, and for the first 10 months of the year, compared as follows:		10 Months.	
	October.	\$125,000	\$1,250,000
1880.....	\$214,000	\$1,250,000	\$1,250,000
1879.....	1,809,000	1,250,000	1,250,000
Increase.....	\$270,000		\$1,921,000

SMELTING WORKS BURNED.—The refinery and smelting works at Chellendam, near St. Louis, were burned on the 19th; loss, \$125,000; insurance, \$35,000. The fire was caused by the bursting of one of the smelting furnaces containing 25 tons of molten lead. John Williams, night engineer, while attempting to save his clothing was overtaken by the flames and burned to a crisp; 150 men are thrown out of employment. The works will be reconstructed.	
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THE True Fissure (Candelaria) thinks the next mining boom will probably be at Gold Mountain. A great many people are going in there this winter, and there will be considerable of a rush next spring. The mines are all gold ledges. A mill is being erected.	
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OWING to the increasing importance of the French possessions in the South seas, the naval stations of Tahiti will henceforth consist of a steam transport, and dispatch boat and sailing	
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RAIN TABLE FOR SACRAMENTO—PREPARED BY THE LATE DR. T. M. LOGAN AND DR. F. W. HAYCH.

Arranged according to the seasons, showing the amount in inches of each month, during thirty-one years, and for each rainy season, to November 23d, 1880; also the quantity for every month, and the annual amount of rain.

News in Brief.	
CHIEF-JUSTICE COCKBURN of England is dead. The spinners are threatening a strike in Fall River, Mass.	
THREE shocks of earthquake at Los Angeles, on Monday last.	
THE population of St. Louis on the first of June last was 350,915.	
CALIFORNIA mine produced 657 tons of ore last week, assaying \$26.	
TWO HUNDRED prisoners in Kist, Russia, are down with typhus fever.	
THE eviction of the families of miners at South Moors, Eng., continues.	
THE Enterprise gun works at Pittsburg, were burned this week. Loss, \$35,000.	
THE port of Todos Santos, Lower California, has been declared open to commerce.	
THE agent of the Canadian government is seeking to induce Irish emigration to Canada.	
THE British ship, <i>Mildred</i> , has foundered in the Atlantic. Her crew of 23 were all drowned.	
A GREAT storm prevailed in Central Italy on 21 inst. A portion of Rome was submerged.	
J. MORA MOSS, one of the Regents of the University of California, died on Sunday last.	
THE activity of Mt. Vesuvius increases. The lava flows continually on the side towards Naples.	
TOM SCOTT says the Missouri, Kansas and Texas railway will commence its extension in 10 days.	
FRIENDS of Whittaker have petitioned the President to restore him to his former place and position.	
CARDINAL MANNING bitterly opposes the settlement of Jesuits within his archdiocese of Westminster.	
A DISPATCH from Dublin says the winter has set in severely. The whole country is covered with snow.	
SINCE January 1st the sum of \$5,967,538 has been placed out on real-estate mortgages by banks in this city.	
THE Directors of the Academy of Design of Chicago, have decided to build an opera house costing \$500,000.	
THE roads which are participating in the cheap-fare fight, agree in reporting increased earnings even in passenger business.	
J. L. KIMBALL, for the past 10 years general passenger agent of the Union Pacific R. R., will soon receive the appointment of assistant general manager.	
THE house of C. Boehringer, in Napa, was burned on Thursday and his two children were burned to death. The mother had left the children in the house alone.	
CHRIS. SCHMIDT, the well-known proprietor of the Hook Farm, near Marysville, the early residence of the late General Sutter, died on Monday night, aged 50 years.	
THE San Francisco Grand Jury have presented indictments for malfeasance in office against Mayor Killoch, Auditor Dunn and City and County Attorney J. L. Murphy.	
A BERLIN correspondent says that the socialists have resolved, in view of the violent means of repression employed against them, to abstain from voting at the political elections.	
THE sugar crop of Louisiana is estimated at 237,800 hogsheads, an increase of 71,000 hogsheads over last year. The molasses yield will exceed that of 1879 by 810,000 gallons.	
THE new Chinese treaty is said to be satisfactory to the Government. It modifies the Burlingame treaty in formulating provisions for limiting or regulating Chinese immigration.	
A MOUNTAIN fire near San Bernardino, on Friday last, destroyed the apiaries of Messrs. Segars and Kennedy. The former lost 40 stands of bees, and the latter 100 stands and his house.	
FOREST fires in the region of Laguna and Green valley, Santa Cruz county, have done great damage to timber, fences, bridges, etc. Davis & Cowell have lost an immense amount of wood.	
A BATTLE was fought in this new railroad town of Mattu, Dakota, on Thursday night between a band of desperadoes and a company of vigilantes. Arkansas Jos, the leader of the ruffians, was killed.	
THREE engines have arrived at Bakersfield from Tulare. They are a reinforcement to those stationed there that had become unequal to the task of pushing the increased freight trains over Tehachape Pass.	
SIR ALEXANDER T. GALT is now hard at work to assist emigration from Ireland to Canada. A syndicate has been formed to carry out this object, and preparations to develop the emigration to Canada on a great scale are going on favorably.	
A BLOCK of granite four and a half ft. in width and thickness, eight ft. in length, and weighing 16 tons, was received in Sacramento from Rocklin last Thursday. It is to be placed in position as one of the gate piers at Capitol park, of which there will be two similar ones at each opening.	
A LARGE number of Nihilist placards have just appeared upon the walls of St. Petersburg, some of them in the most frequented parts of the city. They proclaim in flaming characters the beginning of a fresh revolutionary movement, beside which all former agitations will be considered puerile and insignificant.	
CAPT. JOHN ERICSSON, of Monitor fame, is experimenting in New York harbor with a most destructive engine of war in the shape of a torpedo boat, and he is reported as being confident that no vessel now afloat in the world can successfully resist the attack of this new naval battery, which will deliver its charge of 250 lbs. of	

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The attention of Pacific Coast Inventors is called to the benefits which may be derived from Letters Patent of the Australian Colonies. We invite correspondence from all who may desire full information on the subject. The geographical location of San Francisco gives an advantage in our favor over Eastern agencies, rendering it possible for us to transact business in much less time.

Send for our circular giving full information regarding Patents for the following countries: Victoria, New South Wales, Queensland, South Australia, Tasmania, New Zealand, East India, Etc., Etc.

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INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

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DIVIDEND NOTICE.**OFFICE OF THE****Eureka Consolidated Mining Company,**

Nevada Block, Room 87, San Francisco, Nov. 15, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 61) of Fifty Cents (50c.) per share was declared, payable on Saturday, November Twentieth (20), 1880. Transfer book closed until the Twenty-second (22) instant.

W. W. TRAYLOR, Sec'y.

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Notice is hereby given, that at a meeting of the Board of Directors, held on the Nineteenth (19) day of November, 1880, an assessment, (No. 2) of Twenty (20) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. gold and silver coin, to the Secretary, at the office of said company.

Any stock upon which this assessment shall remain unpaid on the Twenty-fourth (24) day of December, 1880, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

JAMES IRELAND, Sec'y.

Office, No. 216 Sansome Street, San Francisco.

Land Purchasers Association.—Loca-

tion of place of business, San Francisco, California. Notice is hereby given that at a meeting of the Directors, held on the Ninth (9) day of November, 1880, an assessment of Five Dollars (\$5.00) per share (being a part of the 4th installment on the subscription to the stock), was levied upon the capital stock of this Association, payable immediately to the Secretary, at 318 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid, on Friday, the Tenth (10) day of December, 1880, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

C. S. WRIGHT, Sec'y.

N. B.—This assessment is to pay the taxes on the property of the Association for the current year.

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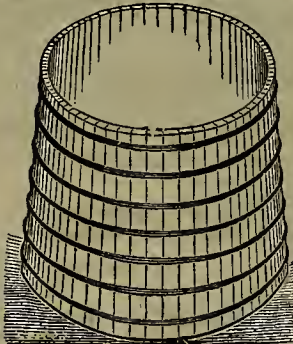
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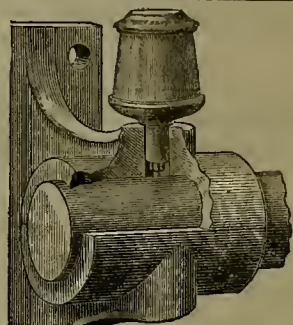
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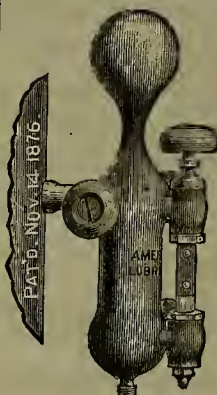
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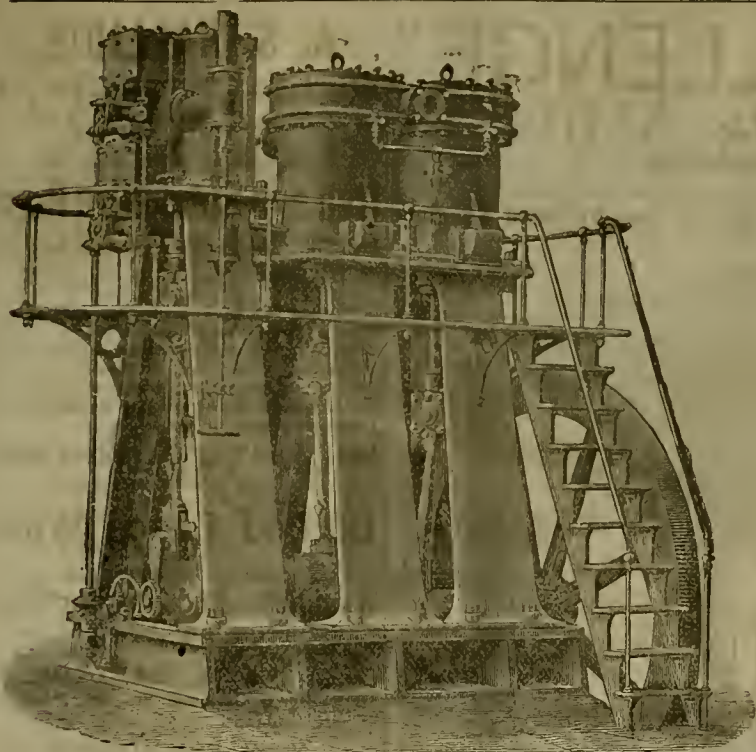
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No. 1 XX is the Strongest Explosive Known.

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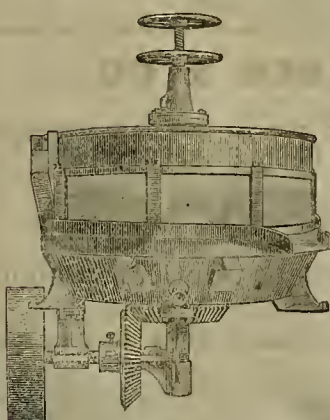
PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

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STEIGER & KERR'S CONTINUOUS DISCHARGE AND GRINDING PAN.



This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all, and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction. The Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is simple, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OGDEN FOUNDRY, STEIGER & KERR, 137 First St., S. F.

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J. A. Fay & Co.'s Wood-Working Machinery; Eminent & Sons' Machinists' Tools; Blake Steam Pumps; N. Y. Belt- ing and Packing Co.'s Rubber Goods; Sturtevant Blowers and Exhaust Fan; Tanite Co.'s Emery Wheels and Ma- chinery; Payne's Vertical Engines and Boilers; Perry's Centrifugal Pump; Judson's Standard Governors; Dreyfus Self-Oilers; Gould Mfg. Co.'s Hand and Power Pumps; Eclipse Windmills; Disston & Sons Circular Saws; Otto Silent Gas Engine; Dues' Elevator Cups; Ballard's Oak Tanned Belting. Also on hand and for sale A FULL LINE OF MILL AND MINING SUPPLIES.

NOTICE!

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Will Please take notice that we have taken the sole agency for the KNOWLES' STEAM PUMP, for the Pacific Coast States and Territories, and keep a full stock of Pumps and Duplicate Parts on hand at all times.

PARKE & LACY,

Nos. 21 and 23 FREMONT STREET.

San Francisco, Cal., September 23, 1880.

LEA AND PERRINS' SAUCE,

Which are calculated to deceive the Public, Lea and Perrins have adopted A NEW LABEL, bearing their Signature.

Lea & Perrins

Which is placed on every bottle of WORCESTERSHIRE SAUCE, and without which none is genuine.

Ask for LEA & PERRINS' Sauce, and See Name on Wrapper, Label, Bottle and Stopper. Wholesale and for Export by the Proprietors, Worcester; Crosse and Blackwell, London, &c., &c.; and by Grocers and Oilmen throughout the World.

"THE \$1,000 CHALLENGE"

Ore Feeder for Quartz Mills.

OVER 600 ARE NOW IN USE, GIVING ENTIRE SATISFACTION.

Awarded First Premium at the Tenth and Twelfth Industrial Fairs of the Mechanics' Institute.
Twenty Per Cent. More Ore Crushed with Fifteen Per Cent. Less Wear of Iron than by Hand Feeding.

The cut illustrates the recently introduced Grip, and also the Spring Attachment, which replace the Weight heretofore used, and which is an obvious improvement.

It is now fully demonstrated, after careful and long continued experimentation and practical use, that the plan upon which a perfect Ore Feeder must be constructed is that of a carrier, and not that of a shaking-table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Jerky or spasmodic contrivances will not answer the purpose for wet or sticky ores.

The Challenge Ore Feeder is now in Use in the following Mills, besides many others

Soulsby.....	20 Stamp.....	Tuolumne county, Cal.
Sheep-Ranch.....	20 ".....	Calaveras " "
Mahoney.....	40 ".....	Amador " "
Zelle.....	40 ".....	" " " "
Placerville.....	40 ".....	El Dorado " "
Gross.....	80 ".....	" " " "
Julian.....	20 ".....	Placer " "
St. Patrick.....	15 ".....	" " " "
Providence.....	20 ".....	Nevada " "
Omaha.....	10 ".....	" " " "
Green Mountain.....	40 ".....	Plumas " "
Plumas-Eureka.....	60 ".....	" " " "
Bulwer-Standard.....	30 ".....	Bodie Dis. Mono, " "
Standard.....	20 ".....	" " " "
Noonday.....	30 ".....	" " " "
Bodie.....	10 ".....	" " " "
Christy.....	5 ".....	Utah Co, Utah, " "
Ontario.....	40 ".....	Parley's Park, " "
Confection.....	20 ".....	Tombstone Dis, Arizona " "
Grand Central.....	20 ".....	" " " "
Harshaw.....	20 ".....	Patagonia, " "
Sunshine.....	20 ".....	Idaho Springs, Col. " "
Homestead.....	200 ".....	Black Hills, Dakota, " "
Father De Smet.....	30 ".....	" " " "
Hidden Treasure.....	40 ".....	" " " "

Superiority of the "Challenge" Demonstrated!

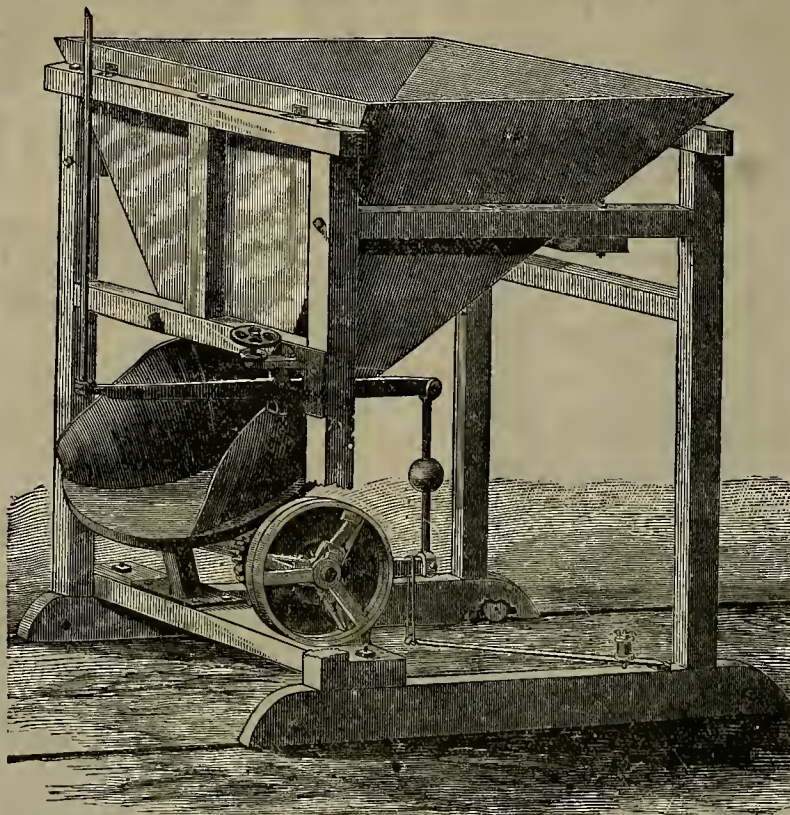
At the "Christy" (five-stamp mill), Uinta county, Utah, 30,000 tons of ore were run over one of the Challenge Feeders, when it was found to be somewhat worn, owing to the peculiar sandstone ore; and it was replaced by an "Eclipse" Feeder, which, after 30 days, during which time the stamps crushed only 35 tons per day, and the Feeder thus proving unsatisfactory, was discarded, and replaced by a new "Challenge" Feeder, with all of its latest improvements. The stamps are now crushing 45 tons per day, and the Feeder is working to our entire satisfaction. The ore is sandstone, crushing easily, so a good deal is put through in a day.

The Harshaw, or Hermosa Mill, of Patagonia District, Arizona, was originally fitted with four (4) "Eclipse" Feeders, which in a few weeks were found to be inadequate and unsatisfactory; and are now replaced by four (4) of the "Challenge" Feeders, which are giving entire satisfaction. The Silver King, Arizona, also removed Eclipse Feeders to give place to "Challenge."

The Solo Mill, of Brown's Valley, Yuba county, Cal., was originally fitted with two (2) of the "Victor" Feeders, manufactured by E. T. Steen; but owing to their insufficiency, they are now replaced by two (2) of the "Challenge" Feeders, which are working to the entire satisfaction of the owners of the mill.

In the Alexander Mill, Grantsville, Nev., four (4) of the and were replaced by four (4) of Hendy's Feeders, and four (4) more of the same pattern added when the second 20 stamps were erected. These cases are simply cited, from among many like instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

Mr. L. W. GREENWELL, of the Tingman Mine, El Dorado Co., or any other person can make \$1,000 by taking up my Challenge. I mean business. Gentlemen, 'put up or shut up.' I will give \$100 to any one who will get this Challenge taken up. I simply want a comparative test made on the nasal wet sticky ore as it comes from the mine.



JOSHUA HENDY, Nos. 49 and 51 Fremont Street, S. F.

DUNHAM, CARRIGAN & CO.,

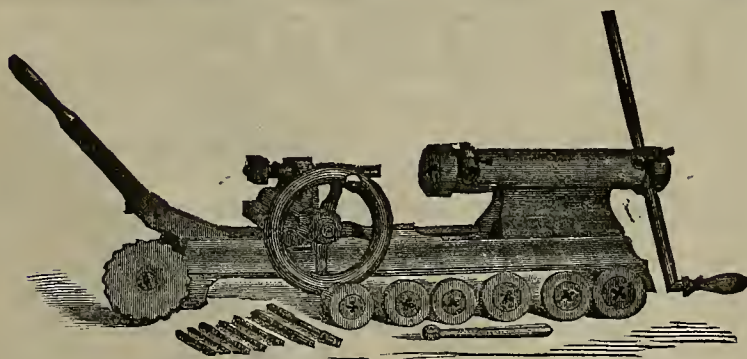
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WITH TAPS, DIES AND COLLETS COMPLETE.

B, Stock 23 inches long, 7 Taps and Dies Cuts $\frac{1}{4}$ to $\frac{3}{4}$ inch.
C, " 26 " " 7 " " " " $\frac{3}{8}$ to 1 "
D, " 53 " " 6 " " " " " $\frac{3}{4}$ to 1 $\frac{1}{2}$ "

No. O. Lightning Hand Bolt Cutters and Tappers.



ESPECIALLY FOR CROOKED WORK!

Made to be bolted to the Bench or Table. Fitted with seven sizes, from $\frac{1}{4}$ to $\frac{3}{4}$ inch. Usual assortment, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

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Iron and Steel Wire Rope
Flat and Round, for Mining, Shipping,
Hoisting and General Purposes.

Having the most complete and extensive Wire Rope Works in the United States, I am prepared to manufacture Wire Rope and Cables of any length or size at short notice, and guarantee the quality and workmanship equal to any made at home or abroad.

Iron, Steel and Galvanized Wire,
Of all sizes, on hand or made to order.

Barbed Fence Wire.

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Hallidie's Endless Ropeway,
For the Transportation of ores, etc.
Send for Circular.

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VULCAN BLASTING POWDER.

The Strongest, Safest, Most Uniform and Reliable "HIGH EXPLOSIVE" Manufactured on the Coast.

MINERS TESTIFY THAT IT IS FREE FROM OBJECTIONABLE FUMES.

We call the attention of all desiring such a Powder to our various grades, which we are prepared to sell at LOWEST RATES.

No. 1.—Equalling Liquid Nitro-Glycerine in Strength. We recommend this Grade in extremely hard rock, boulders, iron, etc.

No. 2.—Will do the work thoroughly in all but the hardest kinds of rock.

No. 3.—For bench work, pipe-clay, soft and shelly rock, outside work and quarrying.

Single and Triple Force Caps, Fuse of all Grades, Vulcan Powder Thawing Boxes, Batteries and Exploders, For Sale at the Lowest Rates.

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GIANT POWDER

MANUFACTURED UNDER A. NOBEL'S ORIGINAL AND ONLY VALID NITRO-GLYCERINE PATENTS.

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Stronger, Better and Safer than any other High Explosive

Judson Powder

IS NOW USED IN ALL LARGE HYDRAULIC CLAIMS.

It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. Triple Force Caps and all Grades of Fuse.

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Apparatus for sale for Mines, Mills, Manufactories, etc.
Plating Machines and Machines for treating Ore man factured to order.
Electric Light furnished on all the principal streets of the city.

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The most complicated cases of defective vision thoroughly diagnosed, free of charge, and all kinds of Lenses made to order.

An Illustrated Journal of Mining, Popular Science and General News.

SAN FRANCISCO, SATURDAY, DECEMBER 4, 1880.

VOLUME XLI
Number 23.

The engraving on this page represents one of the latest improved mining appliances invented in California, and one that in many respects is a very great improvement in its class. This air compressor was invented and perfected by Henry Richmann, of this city, and is manufactured by the Richmann Rock Drill and Compressor Company, at their works, 27 Stevenson street.

The steam cylinder is placed on the bed plate and has two piston rods connecting with cross slide above. The air compression cylinders on the upper plate also has double piston rods, which are connected helow to a cross slide. Gnide rods keep the motion of the alotted cross heads in line, sliding clamps fitting around these guides form the cross haad, and preventing lateral motion hy their peculiar construction.

Ordinarily the crank of the engine operates a shaft on which there is another crank for communicating motion to the piston of the air cylinder. This necessitates the air compressing cylinder being some distance from the engine cylinder and very much out of a direct line, and the air compressing appliance is correspondingly enlarged. There is also considerable torsional strain upon the shaft depending on its length. It was desired to make this compressor as compact and snug as possible and to bring the air cylinder in line with the steam cylinder as near as might be, at the same time providing a peculiar connection of the two pistons, whereby the greatest power of the engine is exerted as the air reaches its highest compression. This peculiar compound crank and connecting slides were therefore employed.

The air piston commences its return stroke before the engine piston has reached the end of its stroke, and the peculiar connection of the two cranks and their nutting arms with the sliding hoxes on the cross-slides is such that as the engine begins to reach the highest or lowest point of its stroke it is forcing the sliding box of the air piston cross-slide transversely to one side of its slotted crosshead, and this hox becomes nearly stationary at the time when the engine crank is passing its dead point, so that the absolute work of the engine is at a minimum while the crank is passing the dead point. After passing that point the power of the engine crank increases until it reaches a position at right angles with the line of travel of the piston, and is exerted as a direct thrust upon the sliding hox, through its connecting arm.

By the peculiar formation of the cranks and bringing the two cylinders nearly in line, two complete cranks do not have to be formed, but the central arm which unites the two crank pins, serves to transmit the power of the engine to the piston of the air compressor. This arm revolves bodily around the axis of the shaft, as both its ends are connected with the crank

By having the double piston rods, whether the valves are in the cylinder head or in the piston, said valves may be of large diameter, as they may come between the piston rods. With a large area for the valves their action is rapid and free. With the piston rod in the center, not half the area can be utilized for valves and seats; but with double rods, over half the area may be utilized.

An air compressor to run two three-inch rock drills is about 4x4 by 7 ft. high, and

IMPORTANT PATENT OFFICE DECISION.—The Commissioner of Patents has rendered an important decision in the matter of interference of John B. Braun & Co., of Baltimore, vs. William T. Blackwell, of Durham, N. C. Braun & Co. applied for registration of the picture of a Durham hull as a trade mark for smoking tobacco, and were granted an interference with Blackwell, who had registered the same trade-mark. Blackwell filed his motion to quash the proceedings on these grounds: That the Patent Office has no jurisdiction to entertain an application for the registration of a trade-mark, the Supreme Court having pronounced the trade-mark law unconstitutional; that it has no power to declare an interference in the matter of such application, and that it has no jurisdiction to adjudge the questions arising under such an interference so declared. The

There are a good many places in this State which will yet yield thousands of dollars, but which to-day are considered played out. There are many spots which will by and by be worked over carefully which will yield good wages to working miners. We all know very well that some ground has been worked over a dozen or more times and yielded something to each set of miners. This is placer ground of course. But some quartz claims which have been abandoned have been started up by new men under better auspices and made to pay very well. Claims which will not pay companies with presidents, secretaries and superintendents all drawing heavy salaries, may pay three or four working miners when they take hold of it. Ledges worked at loss 15 or 20 years ago, can be worked at a profit to-day.

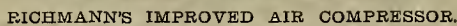
And it is not by any means always necessary to have incorporated companies to carry on a mining operation successfully; any more than it is necessary to have a mill for every little ledge that is opened. A few working miners, with industry and energy, can accomplish wonders. With free gold rock as we have in so many places in our State, and the old-fashioned adastra, a great deal may be accomplished. At least the miner, with any luck, can make a living, and be independent, if he does not get rich. These remarks may be thought to be general in their nature, and to have no particular application. A case in point may be cited to show how correct they are.

Angels Camp, in Calaveras county, used in early days to be a flourishing mining center, as most any old Californian will remember. There were several large quartz mills, a flourishing town and a prosperous community. By and by the place "petered out," as the saying is, and the machinery was removed to other localities, the ledges were abandoned and the place became a very quist little town.

Within the past three or four years, under the new order of things as regards economy of living, scarcity of employment and decrease of wages, a good many prospectors have come along that way and hunted up claims. Many new ledges have been found and old ones reopened. Now there are 300 or 400 men in the neighborhood, and Angels is quite a lively little place. Most of the ore is "fres gold" and can be worked in an arrastra.

And here lies one of the secrets. This "poor man's mill" has been of great advantage to the locality. The men had no hopes of mills being built, as what were there had been taken away. In consequence they built arastras, and there are now 50 or 60 of these around Angels and that part of the country, all paying well. These are generally run in pairs, and by water power. The water does not cost more than \$3 or \$4 per day. It does not cost much to get out ore and work it in the arastras. It is all free gold rock nearly. Some of the sulphureted rock is sold to the mill at Murphys, where the generality of it sells for \$40 per ton. These miners have gone to work and taken the hull by the horns. They haven't waited for capital, though they would like some of it to come their way. They are all a pretty prosperous looking set we are told. And no doubt other places in this State, treated in the same way, would produce like results.

CAUSE OF THE IMPERIAL FIRE.—The superintendent of the Con. Imperial expresses the opinion that the recent fire was due to the carelessness of the engineer, whose duty it was to hoist and lower men through the winze. He says: "In my opinion the fire must have ignited from a candle used by the engineer, whose duty it was to run the engine to hoist and lower men through said winze, or possibly it may have been from hot embers or sparks falling from the pipe of the engineer. It started in a cooling house where the engineer was accustomed to stay when not required at the engine. Of course we cannot say to a certainty just how it did originate, but we are satisfied that it was carelessness on the part of the engineer, and not arson on his part."



weighs about 2,500 lbs. The compressed air is stored in the frame and hose, as previously stated, the frame being the air receiver. The compressor is strongly and well made, and after having been tested about a year, has been introduced into several mines on this coast.

THE Board of Naval Engineers, consisting of Chief Engineers Loring, Ayres and Magee, who were ordered to make experiments with the small steamer, *Anthracite*, which recently crossed the Atlantic, to decide as to her economic qualities, have made a report to the Secretary of the Navy of the most favorable nature. They say her special qualities as to speed and the expense of operating are admirable and deserving of special notice.

THE Secretary of the Interior on Monday decided the appealed case of the Seaton mining company *vs.* John A. Davis, appellant, for patent to the Peerless quartz mine in the Sacramento, California, land district. The Secretary directs that the application of Davis be permitted to take the usual course as in the case of an original claim.

motion was argued on behalf of Blackwell by Mr. Fuller, of North Carolina, and Phillips, Maury & Phillips, of Washington D. C., and opposed on behalf of Braun & Co. by A. H. Evans & Co. The Commissioner decided that he had jurisdiction, and ordered the interference to proceed.

ANOTHER MINE SOLD.—Concerning the Napa Con. Quicksilver mine, the Boston *Economist* of November 20th says: A meeting of the subscribers to the syndicate for the purchase of the above quicksilver property was held on the 17th inst., at the office of Messrs. Humhart & Co., 95 Milk street. The sale of the property was closed to the syndicate, and the following well-known Boston gentlemen were nominated and unanimously elected to act as Directors of the company for the ensuing year: Frederick O. Prince, Henry Hastings, Dudley Hall, Frank B. Cotton and Orrin Murray. Edward Hastings was elected Secretary.

THE Grand Victory mine at Squaw hollow, El Dorado county, has just started up its new 50-stamp mill, which is run by a turbine wheel.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—*Ens*

El Dorado County Mines.

EDITORS PRESS:—The Kimball mine is situated in the Gold Hill mining district, about five and a half miles from Placerville, and has become somewhat noted of late in local circles. The mines of this locality are mostly of the "pocket" character, and many rich strikes have been made in various locations. In some respects the Kimball mine is of the same character, and the pockets have been very plethoric, reports giving it credit for several that have yielded from \$2,000 to \$5,000 each; but in addition to these pockets the whole ledge matters prospects well in gold, and will pay, Mr. Kimball avers, from \$15 to \$30 per ton. The ore is very peculiar, resembling granite more than it does quartz, but fine quartz stringers are woven all through it. The mine is now being operated by Kimball & Anahle, who have it in first-class shape. The shaft is now down about 110 ft. upon the ledge, and drifts are being run with flattering results. The hoisting works, propelled by steam power, run like clock work, and the building is commodious and most convenient for the purpose. A 10-stamp mill is in course of construction some 200 yards below the mine, in a splendid location, which will be run by water supplied by the El Dorado Water and Deep Gravel Mining Co., which company supplies that whole section of country with water for mining and irrigating purposes.

A tramway will be erected from the mine to the mill, and in fact everything will be done upon the most approved scale. A large amount of ore is now upon the dump awaiting the completion of the mill, and it is rapidly accumulating. While there Mr. Kimball showed me some samples of rich ore taken from the mine, which, considering quantity, was the richest I ever saw; and the peculiarity of the quartz renders the inspection of it peculiarly interesting.

MINER.

The Ferguson Mine.

EDITORS PRESS:—The Ferguson gold mine, in Mariposa county, is opening out most satisfactorily, and the recent developments are confirming the character it has already earned for permanence and profitable ore. Immediately after the new hoisting and other machinery was got into operation, the sinking of the Ferguson shaft was resumed, and it has now reached a depth of 50 ft. below the 200 ft. level. It goes down right in the heart of the "Ferguson" ore body. The vein is from 2½ to 5 ft. wide, carrying gold, and galena, and other sulphurets all through the quartz. The gold is found in larger particles as the sinking proceeds, and the character of the quartz is exactly similar to that above the 200 ft. level, which yielded the owners a clean profit of \$30,000 from six months' working with the old mill of eight stamps, recently replaced by two more powerful batteries of ten stamps. The 100 ft. of sinking will be completed by December 31st, when the 300 ft. levels will be started, and this prolific ore body opened out for systematic stoping. The prospects of the mine were never brighter than they are to-day.

L.

Pacific Coast Indians.

The annual report of the Indian Bureau contains some features of distinctive interest on the Pacific coast. Acting Commissioner Marble says: The condition of the Mission Indians of California has become yearly more deplorable. They are estimated to number about 3,000, and their settlements are scattered over portions of San Bernardino and San Diego counties, and chiefly in the mountain and desert districts, embraced in a range hundreds of miles in extent. In the last annual report of this office these Indians were made a subject of special mention. Attention was drawn to the fact that many of them were occupying lands by suzerainty which their ancestors had cultivated from time immemorial, and had held by an undisputed right, but that such lands had been found to be within the limits of private land claims, confirmed by the Courts to grantees under the Mexican Government before the acquisition of California by the United States, and that the owners thereof were threatening the Indians with summary ejectment. Legislation to provide them with suitable and permanent homes was urgently recommended, but no action was taken by Congress. Agent Lawson's report for the current year states that their ejection from the ranchos San Jacinto and San Jose del Butte is liable to occur at any time, and there being no unoccupied lands except such as are uninhabitable, the only alternative left these hitherto peaceful and thrifty communities is to wander about singly or by families, and swell the vagabond class that already infests the villages and towns, to become a prey to the vices to which as yet they are comparative strangers. He also reports that about 15 families were some time ago forced to remove from the Cucca ranch, in San Diego county, under similar circumstances. The Acting Commissioner continues: The Mission Indians, as a class, are reported to be in-

dustrious, maintaining themselves by cultivating their little fields or in laboring for ranchmen in the vicinity of their villages. During the sheep-shearing season they are greatly in demand, being well skilled in this kind of labor. In the season of 1879 the supply of water for irrigating purposes on the desert, some 50 to 80 miles distant from the agency, where hundreds of these Indians live, entirely failed, and they were compelled to depend for subsistence upon a wild bean which grows in the desert, never having received any aid from the Government, and being accustomed to the miserable destitution enforced by their helplessness, they endured hunger and thirst without seeking or expecting help. Then, for the first time in their history, their agent, hearing of their condition, applied for assistance, to which the department promptly responded by ordering the sum of \$500 to be expended in supplies to relieve their wants. In the interest of common humanity, something should be done for this uncomplaining people, toward providing them with a home. They do not ask for supplies; all they ask for is a reservation on which they can earn a subsistence for themselves and families. Their educational and religious interests have also been unprovided for. Recently the Department has authorized the buying of two school-houses in two of the larger settlements. But little, however, can be effected in this direction until the tribe is consolidated and brought under the controlling influence of the agent, and to this end I earnestly recommend the passage of appropriate legislation in their behalf. The report says, with reference to Chief Winnemucca's tribe, now in Nevada, that it is not considered desirable to compel them to remove to the Malheur reservation, and most of the other Indians formerly collected there have been removed to Yakima. It is recommended that all of the lands included in the Malheur reservation be appraised and sold, and the proceeds invested for the benefit of the Indians. These lands comprise nearly 1,800,000 acres. The condition of affairs at the Yakima agency, where 3,000 Indians are collected, is reported to be highly gratifying. They are extensively engaged in agriculture and stock raising; cultivate 8,000 acres of land, and last year raised 35,000 bushels of wheat, besides various other products, including 1,000 tons of hay; 3,300 of them now wear a civilized dress. They have built a handsome church and a number of first-class farm houses, and less than 1% of their wants is now supplied by the Government. Their complete civilization, under the excellent management of their old agent and friend, Wilbur, is believed to be near at hand. Attention is called to the fact that treaty provisions providing for the support and civilization of the following tribes expired last June, viz: The Walla Walla, Cayuse and Umatilla tribes in Oregon, and the D'wamish, Makales, Quinalts, Skollams and Yakamas in Washington Territory. The report says: The present condition of these Indians renders it very important that the aid and assistance heretofore extended be continued, and that early steps be taken for their permanent settlement upon lands in severalty, and for the sale of so much of their respective reservations as may not be required by them.

Progress Toward Civilization.

Many of these tribes have made commendable progress in civilized pursuits in the last few years, and there is an uneasy feeling and great anxiety on the part of many of their leading chiefs to know what the policy of the Government will be toward them. The persevering progress made by the San Carlos and Arizona Apaches toward civilization is described with much satisfaction, and it is predicted that unless some obstacles, such as a diversion of their supply of water for irrigation, be placed in the way, the so-called "intractable Apache" will, in a few years, be taught to raise the greater part of his subsistence. The Industrial School established at Forest Grove, Oregon, for the benefit of the Indians on the Pacific coast, is reported to be doing good work, under the management of Lieut. Wilkinson, U. S. Army, and a liberal appropriation for its enlargement is earnestly recommended. The attention of Congress is again called to the necessity of making some provision for the education of the Alaska Indians, and it is suggested that an appropriation of a few thousand dollars for that object would enable the Bureau to educate some Alaska youths at Forest Grove, who, after a few years' training, would be fitted to become teachers among their own people.

THE CONCENTRATOR.—The copper concentrator of Boardman & Stephens has got down to active work. The building, located some distance south of the copper smelter, is fitted up with a part of the machinery formerly used in the National mine, and with a rock breaker, screens, and all other needed appurtenances. The works are at present making a run on ore from the Parrot mine, where there is a dump of 2,500 tons for the treatment of which Boardman & Stephens have the contract. The process employed is simple and comparatively cheap, and is a success as far as the concentration is concerned. The ore, as taken from the mine, contains from 12% to 15% of copper, but on being run through the separator is found to assay from 26% to 46% of that metal—a sufficient amount to pay a profit after being sent East for reduction. The capacity of the works is about 25 tons per day, and enough of low grade ore is already promised the new company to keep them engaged during the coming winter. Ten men are employed.—*Butte (Montana) Miner.*

To Lease or Not to Lease.

There is a wide difference of opinion among miners and mine owners in regard to the propriety of working mines under lease or day's pay. In the case of a strong company possessed of sufficient working capital, day's pay men, or what is still better, contractors, are undoubtedly preferable to lessees. If the company is in such a situation, however, that the employment of lessees or a cessation of work is inevitable, the former course is certainly to be preferred. This closing down of a mine for a year or two while a capital is being raised for its development entails an unnecessary loss to its owners. The underground workings suffer damage from water and other causes which a daily inspection of the property would prevent, and the detriment to hoisting machinery or other surface improvements is equally as great.

The great difficulty in leasing lies in the fulfillment of the terms of the lease where it is adverse to the interests of the lessees. In such cases proper timbering and development work requires the most careful supervision to insure its performance, and the unfortunate lessees are usually more to be pitied than blamed; while, on the other hand, their greatest success secures nothing to the owners but the exact stipulations of the lease. Men working for day's pay are not impelled by the stimulus of hope that inspires lessees, and where inefficient foremanship permits it, there is sometimes a successful attempt to do the smallest amount of work in the largest amount of time. This state of affairs is obviated by the employment of contractors where the nature of the work admits of contract labor—such, for instance, as stoping, sinking and running levels. The loss of mineral on the stulls is doubtless greater with contractors than with men employed at so much per day, but only in case of the exploitation of ore of extraordinary richness, would this counterbalance the economy of time; and where the still dirt is crushed and concentrated, as is the case at the Dunderberg, for instance, it is of still less importance. At the best, however, nearly one-half of the labor expended on a mine must be done by day's pay men unless the property is leased, but much of this work necessarily insures a given amount of labor in a given time.

Although it is undoubtedly wrong in principle, it is claimed by at least one mine superintendent in this district that leasing is the most economical plan of working a mine. If this be so, either the lessees do not average the wages paid to miners, or day's pay men do not earn their wages. Mining is a vocation liable to wide variation in its results, and companies should at all times have absolute daily control over their properties so as to be enabled to receive every advantage that may accrue to them. Leasing does not permit this.—*Colorado Miner.*

October Bullion Product

The output of bullion throughout California, Nevada, Idaho, Utah, Arizona and Dakota for October was probably as large as for the months immediately preceding. There has been more delay, however, in getting in the returns at this office. From many producing mines in the above States and Territories no reports have ever been received, the managers declining to make public, even without cost to themselves, the amount of bullion produced from month to month. Some of the other mines, from which we had a right to expect reports, have either declined or neglected to respond for the month of October. The three Dakota mines in the annexed list are all estimated. The reports from the other gold mines for October are official, as follows:

GOLD MINES.	
Bodie Con.....	\$ 50,500
Blue Tent gravel.....	25,000
Deadwood (Dakota).....	35,000
Gold Hill quartz.....	7,000
Golden Trench (Dakota).....	35,000
Homestake (Dakota).....	140,000
Idaho (Nevada county).....	40,000
Milton Gravel.....	65,000
North Bloomfield.....	46,800
Noonday.....	25,600
North Noonday.....	20,000
Oneida.....	12,400
Standard Con—\$11,200 silver.....	161,300

Total thirteen gold mines.....\$604,400

The report of the Blue Tent gravel of Nevada county, California, is the first made. The total is the result of the first clean-up from a run of 13 days. Several California gold claims are necessarily omitted for causes already stated. The October reports of the silver mines, so far as we have been able to gather them, are as follows:

SILVER MINES.	
Argenta.....	\$ 2,100
Christy (Utah).....	26,400
Harshaw (Arizona).....	80,000
Independence.....	7,700
Indian Queen.....	17,200
Manhattan.....	148,400
Mt. Diablo.....	85,100
Northern Belle.....	82,400
Ontario (Utah).....	225,100
Richmond Con.....	129,000
Silver King (Arizona).....	50,000
Star.....	28,800
Tip Top (Arizona).....	30,000

Total thirteen silver mines.....\$901,200

The Harshaw, Richmond Con. and Silver King are estimated. There is quite a number of other silver mines that ought to be in the above list, and it is no fault of ours that they are omitted. Only two of the Comstock mines

produced any bullion of consequence in October. Following is the October statement of four mixed metal mines:

GOLD AND SILVER MINES.			
	Gold.	Silver.	Total.
California.....	\$ 57,900	\$ 27,500	\$ 85,400
Con Virginia.....	52,500	10,000	71,500
Eureka Con.....	44,100	104,600	138,700
Western.....	24,800	106,100	129,900
Totals.....	\$170,300	\$246,200	\$425,500

*Including a value of \$23,400 for lead.

The California and Con. Virginia did not do as well as in September, while the Eureka Con. and Western did better. The descriptions of bullion in the above statement compare as follows with the report for the same month last year:

	1879.	1880.
Gold.....	\$ 649,100	\$ 832,500
Silver.....	917,000	1,130,200
Lead.....	57,900	23,400
Totals.....	\$1,624,000	\$1,991,100

In October, 1879, we had reports from 10 gold mines, 19 silver mines and four gold and silver mines. For the same month in 1878, 36 mines produced \$2,250,000.

Extending these statistics so as to cover the 10 months of the year, we have the following record:

	No.	1879.	No.	1880.
January.....	35	\$1,900,900	29	\$1,532,200
February.....	32	1,811,900	28	1,367,900
March.....	35	2,564,300	23	1,487,400
April.....	30	2,437,300	25	1,240,400
May.....	36	1,884,300	20	1,385,500
June.....	36	1,780,500	30	1,767,800
July.....	50	2,103,000	38	1,631,000
August.....	33	1,714,500	32	1,775,000
September.....	33	1,833,400	32	1,892,100
October.....	33	1,624,000	30	1,091,100
Totals.....		\$19,810,300		\$16,151,700

The description of treasures embraced in the foregoing totals compare as follows:

Gold.....	\$ 8,311,400	\$ 7,005,200
Silver.....	10,908,400	8,860,800
Lead.....	590,500	235,700
Totals.....	\$19,810,300	\$16,151,700

During the corresponding period in 1878, an average of 34 mines reported an aggregate of \$33,816,100. The total for 1879 is from an average of 36 mines, while the report for the current year is from an average of 29 mines. Apparently, the product this year is only 50% of the total for 1878, but some account must be taken of the lessened number of mines reporting. We do not believe that the grand total of all the mines shows such a ratio of decrease.—*Bulletin.*

TWO GREAT MINES.—At their recent half-yearly meeting of the stockholders of the Sierra Buttes mining company in London, the secretary made a report of the financial affairs of the company, to the effect that the net profits of the half-year ending June 30, 1880, amounted to \$32,595, and that there was a balance from the previous accounts of \$48,335, making total available \$80,930, and about \$1,980 that had been applied to production of property and water rights. A dividend of one dollar a share was then declared, aggregating \$30,625. The September product was \$28,220, working expenses, \$17,831, outlay for shipments, \$974. At the last meeting of the stockholders of the Plumas-Eureka mining company, (whose affairs are under the same management as those of the Sierra Buttes) in London, the secretary made a report of the affairs of the company to the effect that there were in the treasury, \$173,385, of which \$6,490, were to be paid for a debt on Mohawk mill, leaving a balance of \$167,895. A dividend was then declared of three shillings per share, aggregating \$105,438 leaving \$62,430 in treasury. Thirty-three thousand six hundred and thirty-six tons of ore were handled during the half-year, at an average cost of \$2.65½ per ton; milling cost being 70½ cents per ton.

BONDHOLDERS.—A special agent of the Census Office has completed an investigation of the ownership and distribution of 4% and 4½% registered bonds: Total 4½% registered, \$528,100,950; individuals, \$271,435,900; National Banks, \$136,526,700; Banks and Trust Companies, \$113,306,900; foreign holders, \$6,831,450. Total 4½% registered bonds, \$170,280,800; individuals, \$72,010,900; Banks and Trust Companies, \$59,620,400; National Banks, \$39,461,950; foreign holders, \$5,187,550. The Eastern States own 17.9-10% of the bonds; the Middle States, 64.7-10%; the Western States, 14.2-10%; the Southern States, 3.5-10%. In the Eastern States, 70% of the bonds are owned by males and 30% by females; in the Middle States, 81 by males; in the Western States, 81 by males; in the Southern States, 78 by males.

TIoga DISTRICT.—E. B. Burdick, a well-known mining man, is in from Tioga district, with exceedingly rich rock taken from a shaft sunk 60 ft. in a compact vein. The ore is on exhibition at the Occidental parlors, and is a cross between the richest ore of the Manhattan, at Austin, and the Con. Virginia, on the Comstock. Tioga district is near (in fact on) the summit of the Sierra Nevada mountains, at the head of Bloody canyon, and in view of the importance of recent discoveries in the new district, W. J. Walker, who has large interests both in Tioga and Homer districts, intends building a toll road up Bloody canyon from King's ranch to the summit early next spring. Several Bodie parties will leave this evening for Tioga.—*Standard News.*

MECHANICAL PROGRESS.

Rules for the Management of Steam Boilers.

Engineers and users of steam power will be benefited by keeping constantly in mind the following rules:

1. Condition of the Water.—The first duty of an engineer, when he enters his boiler-room in the morning, is to ascertain how many gauges of water there are in his boilers. Never un-bank nor replenish the fire until this is done. Accidents have occurred, and many boilers have been entirely ruined from neglect of this precaution.

2. Low Water.—In case of low water, immediately cover the fire with ashes: or, if no ashes are at hand, use fresh coal. Do not turn on the feed under any circumstances, nor tamper with, nor open the safety valve. Let the steam outlets remain as they are.

3. In Case of Foaming.—Close the throttle, and keep closed long enough to show the true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In case of violent foamings, caused by dirty water, or change from salt to fresh, or vice versa, in addition to the action above stated, check draft and cover fire with fresh coal.

4. Leaks.—When leaks are discovered, they should be repaired as soon as possible.

5. Blowing Off.—Blow down, under a pressure not exceeding 20 lbs., at least once in two weeks; every Saturday night would be better. In case the feed becomes muddy, blow out six or eight inches every day. Where surface blow cocks are used, they should be often opened for a few moments at a time.

6. Filling up the Boiler.—After blowing down, allow the boiler to become cool before filling up again. Cold water pumped into hot boilers is very injurious, from sudden contraction.

7. Exterior of Boiler.—Care should be taken that no water comes in contact with the exterior of the boiler, either from leaky joints or other causes.

8. Removing Deposit and Sediment.—In tubular boilers the hand-boles should be often opened, and all collections removed from over the fire. Also, when boilers are fed in front and blown off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

9. Safety Valves.—Raise the safety valves cautiously and frequently, as they are liable to become fast in their seats and useless for the purpose intended.

10. Safety Valve and Pressure Gauge.—Should the gauge at any time indicate the limit of pressure, see that the safety valves are blowing off.

11. Gauge Cocks, Glass Gauges.—Keep gauge cocks clear and in constant use. Glass gauges should not be relied on altogether.

12. Blisters.—When a blister appears, there must be no delay in having it carefully examined and trimmed or patched, as the case may require.

13. Clean Sheets.—Particular care should be taken to keep sheets and parts of boilers exposed to the fire perfectly clean; also, all tubes, flues and connections well swept. This is particularly necessary where wood or soft coal is used as fuel.

14. General Care of Boilers and Connections.—Under all circumstances, keep the gauge cocks, etc., clean and in good order, and things generally in and about the engine and boiler-room in a neat condition.—*Ex.*

STEEL SHIPS.—Experiments now being made indicate that the model ship of the future will be built of steel. It is found that this material gives greater strength and buoyancy in proportion to weight than iron. It is said that a steel ship can carry one-fifth more weight than an iron ship of the same dimensions, providing the freight is of a character to admit the difference in loading. It is urged against steel ships that salt water will work on the material with more corroding effect than upon iron. But this is not yet established as a fact. So far as the United States is concerned, the present is a good time to commence anew in ship-building. We have very little to condemn as worthless. We have no national navy worthy of the name, and our mercantile navy is fast disappearing from the seas. We can encourage new processes in building, without giving much thought to the ships that these new processes will displace. It appears, however, that there is more activity among English builders to demonstrate which is the best material for ships than among Americans.

STEEL STEAMBOAT SHAFTS.—Preparations are being made at the Black Diamond Steel Works of Park Bros. & Co., at Pittsburgh, Pa., to cast the first steel shaft for steamboats ever manufactured in America. Heretofore such shafts could only be made at Krupp's famous works in Germany, and it was only last week that a Pittsburgh towboat, the Joseph B. Williams, was supplied with one of these shafts, transported especially for it from Germany, and placed in the boat at Cincinnati. Since the immense steam hammers have been cast at the Black Diamond Steel Works, Pittsburgh will also be able to cast these large shafts, saving to steamboatmen the cost of transportation from Germany. Pittsburgh is the only place in the United States where

The Expansion of Steam.

Prof. R. H. Thurston writes to the *Scientific American* as follows in answer to the question: "What is, really, the proper point of cut-off in steam engines to give maximum economy in dollars and cents?" "Some people say one thing and some another. In your 'History of the Steam Engine,' page 473, you say about one-half the square root of the steam pressure is about right, 'in general,' and a writer in the *Journal of the Franklin Institute*, for June, who ought to understand the matter, says that the steam pressure divided by the back pressure gives the number of times to expand to secure maximum efficiency.

"Now, your rule would give, for a Corliss engine with 90 lbs. of steam, a cut-off at one-fifth, while the last would make it one-seventh. Then again, for an old-fashioned engine with condenser, cutting off steam at 25 lbs., your rule makes it about one-third, and the other says one-fiftieth or even one-twentieth, which I know by experience cannot be right." The Professor answers as follows:

The point of cut-off giving maximum economy in steam engines is never precisely the same in any two engines. It will vary with every change of type, with every change of pressure of steam, with every difference in piston speed, and even in two engines built from the same drawings and made from the same patterns, the degree of expansion being the same, the two machines will demand different quantities of steam.

Could all the conditions affecting the expenditure of heat in the production of power be made absolutely invariable, the point of cut-off for maximum efficiency could be determined for those conditions—not by calculation, but by experiment; and it would remain the same just as long as those conditions could be maintained absolutely the same. But this never occurs in practice.

Steam enters the cylinder sometimes barely dry, sometimes superheated, sometimes damp with a watery vapor, and often mingled with water to the extent of 10% or 20%; it even sometimes carries with it more than its own weight of water. It sometimes comes in contact with hot and nearly dry metallic surfaces, which aid in keeping it in a state of maximum efficiency; but it often, in fact usually, meets an interior filled with damp chilling vapors and surrounded by walls cool enough to condense a considerable part of the steam supplied up to the point of cut-off. During expansion the steam never follows precisely the law of expanding permanent gases—with which the pressure diminishes precisely in the proportion in which volume increases—but, by condensation at first and by re-evaporation later in the stroke, the expansion line falls below at first and then rises above the curve expressing Mariotte's and Boyle's law, although frequently approaching that curve pretty closely. If the engine speed increases the steam is usually less affected by causes producing loss; if the speed decreases a loss of economy generally ensues. Large engines are less subject to such losses than small ones, and every reduction in the amount of engine friction permits a closer approximation to theoretical conditions.

It is easy to determine the proper point of cut-off for any defined set of conditions provided they are such as can be mathematically expressed, and the larger the engine, the hotter the steam used, the higher the piston speed, the less the friction, and the more perfect the system of lagging and steam jacketing, the more nearly will the actual correspond with the estimated value; but the theoretical rate of expansion is rarely very nearly attained in our very best practice, and experience shows that we must usually content ourselves with a vastly smaller degree of economy by expansion than would be mathematically predicted.

Instead of cutting off at one-twentieth when using steam at 45 lbs. pressure in a single cylinder condensing engine, we find that a cut-off of at most one-fourth gives, in practice with ordinarily good engines of moderate size, the best results.

In handling non-condensing engines of 200 or 300 horse power, with steam at 60 to 90 lbs., and a speed of piston of about 500 ft. per minute, and using the standard forms of "drop cut-off" familiar to American engineers, we can barely gain by expanding more than five times.

No theoretical determination of the proper point of cut-off has ever been made that is of any service to the engineer. No device yet invented has ever given even a rough approximation to the efficiency indicated on purely theoretical grounds.

We are gradually learning more and more about the behavior of steam in the engine, and are in our every-day practice, as illustrated by the best builders, keeping very close to what is, all things considered, the line of true economy. All these matters must be finally settled by experience.

A CURIOUS HORSE SHOE.—A German manufacturer has invented a horse shoe composed of iron and hemp, which is said to be meeting with considerable favor. The shoe is of malleable iron, having a deep, wide groove, into which tarred hemp rope is firmly wedged. The rope protrudes beyond the rim of the iron, and the whole is said to form a light and serviceable shoe. We wish some German friend would favor us with a sketch from which to make an

SCIENTIFIC PROGRESS.

The Work Now Before Astronomers.

Prof. Asaph Hall, in an address before the astronomical section of the American Association for the Advancement of Science, which lately held its annual session in Boston, gave an admirable outline of the present status and future prospects of the work before astronomers, which we briefly summarize as follows: An accurate knowledge of the proper motions of the fixed stars, and of the great changes of light and heat among them, can only be attained by long continued and laborious observations made through centuries yet to come. Hence, the observations of to-day should be carefully divided up and made so accurately that the astronomers of the future may rely with confidence upon the results of the labors of their predecessors to detect and measure changes which take place only during the lapse of ages. Similarly prolonged observations are also needed for the full development of the secular changes in our own solar system. With the exception of Neptune, the orbits of the planets are already quite well determined; but in many other respects much is yet to be learned. In the case of Saturn, all the tables are in error; but these errors are supposed to arise from some defect in the theory of that planet. The lunar theory is still an unsolved mystery, and all the lunar ephemerides are effected with empirical terms. The observations of the fixed stars are of the highest importance, since they are the fundamental points on which our knowledge of planetary motions and even the motions of the stars themselves depend. Previous to the present century, but little work had been done on double stars. In this field, although the work is simple, the observations should be made with great care and accuracy. The astronomer, above all other scientists, should have patience in his work, and be content to allow future generations to reap the reward of his toil. The physical theories of the universe, of which modern popular science is so productive, are generally worse than useless, notwithstanding he who rants freely about the nebular hypothesis is often considered one of advanced astronomers of the day. A good observation of the smallest double star, or of the faintest comet or asteroid, is worth more than all such vague talk. It is only about 40 years since a stellar parallax was first measured, and then the most powerful instruments were employed. Much remains to be done in this direction. Photography, which has rendered good service in descriptive astronomy, does not admit of the accuracy of measurement required for stellar work. The determinations of the motion of stars toward or away from the sun are so discordant that no confidence can be placed in the results so far obtained. It is hoped that some of the large instruments now in course of construction, may throw more light upon this obscure subject. Argelander and his assistants completed their great catalogue of 324,198 stars in 1861. It is a work of great value and should be extended to other parts of the heavens. By taking account of a large number of stars, it may be possible to determine the motion of the solar system in space. Very few American observatories have been established for the purpose of doing purely scientific work, for they are generally built in connection with some college, and are the product of some local enthusiasm, which builds and equips an observatory and then leaves it helpless for support. The Professor remarked, in closing, that the present and prospective means for placing instruments at elevations of 8,000, and even 10,000 ft., will doubtless result in much good. At such altitudes, we may be able to do, with small apparatus, work, that under ordinary conditions requires much more powerful instruments.—*Californian for December.*

NEW USES FOR ROCK CRYSTAL.—A German maker of philosophical apparatus, Herr Siegfried Stein, of Bonn, has of late strongly urged the claims of rock crystal as a material pre-eminently adapted for the production of normal weights and measures and other instruments of precision. He has made sets of weights, balance beams and scale pans of balances, and portions of engineering instruments from rock crystal, and his innovation has received many favorable comments from professional men. The advantages of rock crystal over metals for such instruments of precision consist in its complete indifference at common temperatures to the action of acids or alkalies, and to the gases and moisture present in the atmosphere, which to a greater or lesser degree must in time affect the last named. For the production of standard weights especially, Herr Stein's suggestion has been received with great favor, his rock crystal weights having obtained the unqualified praise of such eminent analysts as Fresenius and others. For this particular use, it may be added, its superior hardness to the metals usually employed is another decided advantage. Herr Stein urged, on similar grounds, the advantages of rock crystal in the production of standards of measure, whether longitudinal or circular, and in the construction of parts of a

Spectroscopic Study of the Sun.

The intensity and the frequency of reversal of the magnesium rays, in the green region of the solar spectrum, has long attracted the attention of spectroscopists. It has also been observed that the reversal did not affect all the rays at the same time. Prof. Young has made extensive comparisons with the G ray of hydrogen, which is always reversed in the chromosphere; Lockyer has shown that the reversed rays are the longest, and that among the reversed rays that which is the least intense is also the shortest; Tacchini measures the variations of solar activity by the number and frequency of reversals, supposing that the most intense rays appear first and that the energy of the eruptions varies in proportion to the number of reversals. This inequality of reversal has led to the theory that all terrestrial elements are dissociated in the sun into other unknown elements which have more simple spectra than those which are known. This theory implies the impossibility of deducing the constitution of celestial bodies from the spectral study of terrestrial elements until they have been dissociated and their component elements have been recognized.

Fizeau has studied the spectra in various ways. He first examined the influence which the relative intensity of the brilliant magnesium rays exercised on their visibility by projecting them upon the solar spectrum and thus effecting a true reversal. He then repeated his experiments upon the simplification of spectra by varying the intensity of the spark. Finally, guided by Lord Rayleigh's investigations in spectral optics, he studied the influence of a dispersion and of a definition, more or less considerable, upon the number and visibility of the rays, by comparing prismatic and diffraction spectra. His experimental arrangements were the same as those which he adopted in his investigations upon the spectra of hydrogen and nitrogen. They seem to establish conclusively his opinion that a modification in the appearance of the spectrum springs from a physical cause and not from a change in the chemical constitution of the metal or a dissociation, and that the unequal reversal of the magnesium rays is caused by a difference in the intensity of the brilliant rays and not by any special state of the metal.—*Bull. de l'Acad. de Belg.*

Punching Iron.

Tresca's experiments upon the flow of solids, and the experiments upon cold punching by Messrs. Hoopes and Townsend and Prof. Thurston, have induced Prof. Keller to make a series of experiments in the machine shops of Karlsruhe. The pieces, after being punched, were cut and the surfaces treated with a solution of chloride of platinum in water, containing one part of the chloride for 250 to 300 parts of water in volume. The employment of this solution brings out the lines of flow in brown upon a ground of brilliant gray. The operation of punching is divided into two distinct periods. The first begins with a depression at the top, the displaced matter being carried toward the bottom in such a manner that the sides, which are at first vertical and parallel, soon incline toward each other. In proportion as the punch advances the material turns toward the point of least resistance forming a sort of button underneath, the height of which is always much less than the depth to which the punch has penetrated, showing that the metal has either been compressed or that it has been driven laterally into the body of the piece. Keller found by experiment that the specific gravity of the plug was a little less than that of the residue. This fact had been observed by Hoopes and Townsend, but they attributed it to errors of observation. If the plug is cut into sections the density is found to increase toward the top, showing that there is a flow from underneath the punch laterally into the mass of the iron. In the second period, or period of chiseling, the resistance is less; there is no more compression and the plug goes out in proportion to the descent of the punch until the separation is complete.

THE OLDEST SCIENTIFIC SOCIETY.—The Academy of the Lyncei, according to M. De Laveleye, is the oldest scientific society in existence. It was founded at the beginning of the seventeenth century by four young men, who took as their symbol the lynx—an animal then to be found in the Apennines—with the motto, *Sagacius ista*. The members "were to penetrate into the interior of things in order to know the causes and operations of nature, as it is said the lynx does, which sees not only what is outside, but what is hidden within." Their dream was nothing less than the organization of modern science based on the method of observation—the *clerk* of knowledge. The academy was to have in the four quarters of the globe, dwellings with sufficient endowments to maintain the members, who might live there in common. These dwellings were to be provided with libraries, laboratories, museums, printing presses and botanical gardens—in a word, with everything necessary for study. Their observations were to be communicated by writing to all the members. The Lyncei were to renounce marriage as a *mollis* and *effeminata* requies, and injurious to study; nevertheless, monks were not admitted. The academy was reorganized in 1875, and has members of various nationalities. Among the English members are Gladstone, Freeman, Rawlinson and Herbert

Table of Highest and Lowest Sales in
S. F. Stock Exchange.

Name of Company.	Week Ending Nov. 11.	Week Ending Nov. 18.	Week Ending Nov. 24.	Week Ending Dec. 1.
Alpha.....	3.45	21 4	3 21	2.20 31 21
Alta.....	4.10	3.60 63 6	53 4.15 128 62	53
Andes.....	90c	80c 1.15 95c	90c 80c 90c 85c	
Alps.....	40c	30c 35c 25c	25c	20c
Argenta.....	40c	30c 35c 25c	25c	20c
Atlantic.....	40c	30c 35c 25c	25c	20c
Aurora Tunnel.....	40c	30c 35c 25c	25c	20c
Baltimore Con.....	1.95	1 21 1.70	1 95c 1.10 95c	
Belcher.....	1.95	1 21 1.70	1 95c 1.10 95c	
Belmont.....	1.95	1 21 1.70	1 95c 1.10 95c	
Best & Belcher.....	1.95	1 21 1.70	1 95c 1.10 95c	
Bullion.....	2.20	1.70 2.05 1.1	1.60 1.20 1.60 1.40	
Bechtel.....	1.35	1.30 1 76c	1 76c	1 80c
Belle Isle.....	90c	60c 65c	75c 50c 60c 65c	
Bodie.....	41	4 4	4.30 42 4.30	
Benton.....	1.40	1.20 1.80 1.20	1.15 95c 2.40 1.15	
Bulwer.....	1	1	1.16 1.10 11	
Boyle.....	100	60 100 5c	5c	5c
Black Hawk.....	100	60 100 5c	5c	5c
Belvidere.....	150	100 100 5c	5c	5c
Booker.....	40c	20c 40c 30c	20c 30c 15c	
Calaverita.....	2	1.80 1.90 1.70	1.10 1.60 11	
Challenge.....	90c	60c 90c	75c 70c 70c	
Chollar.....	2.15	1.70 2 11	1.15 1.15 1.55	
Confidence.....	31	34.35 3.60 3	4 27	
Con Imperial.....	15c	20c 15c 20c	10c 10c	
Con Virginia.....	2.80	2.20 2.40 2.30	2.20 21 2.05	
Crown Point.....	11	1 11	1.15 1.30 1.10	
Con Washoe.....	30c	20c 30c	30c 20c	
Champion.....	1.05	90c 1	1	
Concordia.....	1.05	90c 1	1	
Dayton.....	1.05	90c 1	1	
DeFrees.....	1.05	90c 1	1	
Danby.....	1.05	90c 1	1	
Day.....	20c	35c 20c 25c	20c 35c	
Eureka Con.....	171	171	18 17 181 18	
Endowment.....	1.60	80c 1.90 11	11 1.05 1.30 1.10	
Gen Thomas.....	1.85	1.55 1.65 11	11 1.65 11 1.65	
Grand Prize.....	1.85	1.55 1.65 11	11 1.65 11 1.65	
Golden Charlotte.....	1.60	65c 95c 80c	80c 75c 95c 80c	
Golden Terra.....	1.60	65c 95c 80c	80c 75c 95c 80c	
Goodshaw.....	31	3.35 4.60 3.80	31 3.45 4 4.20	
Gould & Curry.....	8.60	3 4.20 31	4.05 3.10 5 3.20	
Hale & Norcross.....	150	150	150	
Hillside.....	150	150	150	
Highbridge.....	150	150	150	
Homestake.....	150	150	150	
Hussey.....	150	150	150	
Independence.....	45c	40c 40c	40c 40c	
Julia.....	80c	40c 80c	40c 80c	
Justice.....	1	80c 2.05 11	1.60 1.10 2.10 1.60	
Kentucky.....	11	1.20 1.60 11	11	
Kosuth.....	11	1.20 1.60 11	11	
Keystone.....	11	1.20 1.60 11	11	
Lady Bryan.....	30c	20c 40c 30c	25c 15c 40c 25c	
Lady Wash.....	30c	20c 40c 30c	25c 15c 40c 25c	
Leopard.....	30c	20c 40c 30c	25c 15c 40c 25c	
Leviathan.....	30c	20c 40c 30c	25c 15c 40c 25c	
Leeds.....	30c	20c 40c 30c	25c 15c 40c 25c	
Lee.....	30c	20c 40c 30c	25c 15c 40c 25c	
May Belle.....	10c	10c	10c	
Modoc.....	10c	10c	10c	
Manhattan.....	95c	11 1 11		
Martin White.....	75c	50c		
McClinton.....	10c	5c 10c		
Meadow Valley.....	71	61 81 7 71	61 7 71	
Mexican.....	71	61 81 7 71	61 7 71	
Mides.....	30c	25c 30c	45c 70c 50c	
Morning Star.....	30c	25c 30c	45c 70c 50c	
North Con Virginia.....	11	11	11	
New York.....	93	9 81 81 9 81 81 8		
Northern Belle.....	1.10	75c 1.20 80c	1.10 1.10 1	
New Oso.....	1.10	75c 1.20 80c	1.10 1.10 1	
Navajo.....	1.10	75c 1.20 80c	1.10 1.10 1	
Ocidental.....	71	51 7 61 51 51 51		
Ophir.....	1.05	70c 11 90c 90c 75c 80c 65c		
Overman.....	1.05	70c 11 90c 90c 75c 80c 65c		
Panther.....	1.05	70c 11 90c 90c 75c 80c 65c		
Phenix.....	1.05	70c 11 90c 90c 75c 80c 65c		
Phil Sheridan.....	1.05	70c 11 90c 90c 75c 80c 65c		
Potosi.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Prospect.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Raymond & Ely.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Richer.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Rock Island.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Rye Patch.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Rough & Ready.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Sage.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Seg Belcher.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Sierra Nevada.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Silver Hill.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Silver King.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Silver Prize.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Succor.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Summit.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Scorpion.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Solid Silver.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
South Bodie.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
South Standard.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Star.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
St. Louis.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Syndicate.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Tioga Con.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Tiptop.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Trojan.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Union Con.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Utah.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Vermont Con.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Ward.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Wells Fargo.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Woodville.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
White Cloud.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		
Yellow Jacket.....	1.90	1.55 2.10 1.80 11 1.60 2 1.85		

Sales at S. F. Stock Exchange.

Wednesday A. M., Dec. 2.	60 Utah.....	5
1035 Alta.....	11 11 11	1.40
30 Alpha.....	3.50	
120 Andes.....	3.50	
2335 Benton.....	2.40 2.20	50c
235 Belcher.....	1 200	Armenta.....10c
100 Bullion.....	1.40	20c
110 B & Belcher.....	81	25c
80 Confidence.....	300	Boston.....5c
125 Con Virginia.....	2.10 2.15	50c
75 Chollar.....	1.90	50c
140 California.....	1.10	25c
140 Crown Point.....	1.10	25c
140 Con Imperial.....	1.10	25c
700 O Dorado.....	40c	10c
100 Exchange.....	1.15	10c
160 Gould & Curry.....	3.80	1.55
380 Hale & Norcross.....	4.90 2.60	1.00 1.00
2675 Justice.....	2.20 1.10	1.00 1.00
40 Julia.....	35c	1.00 1.00
250 Lady Wash.....	40c	1.00 1.00
70 Mexican.....	61 61	45c
150 Morning Star.....	50c	75c
300 New York.....	25c	45c 50c
300 Ophir.....	20c	10c
150 Overman.....	70c 75c	350 Star.....10c
220 Potosi.....	1.35 2.20	50c
80 Savage.....	2.20	10c
150 Silver Hill.....	40c 1.40	30c
610 Sierra Nevada.....	71	10c
640 Union.....	101 101	50c

AMONG the minerals sent to the State Museum from Inyo were a collection of garnets, found in the formation at the old San Carlos tunnel, Independence. They are of the variety known in mineralogy as Almandine, an iron alumina garnet.

THE tailings mills on the Carson and in the canyon have been shut down, throwing about

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Alpha Con M Co	Nevada	13	1 00	Oct 27	Nov 30	Dec 21	Wm Willis	309 Montgomery
Belcher S M Co	Nevada	25	75	Nov 3	Dec 6	Dec 27	J Crockett	419 California
Black Hawk G M Co	Cal	10	10	Nov 10	Dec 16	Dec 27	H A Charles	302 Montgomery
Benton Con M Co	Nev	4	50	Oct 27	Nov 30	Dec 20	W Watson	309 Montgomery
Best & Belcher M Co	Nev	19	50	Nov 6	Dec 10	Dec 31	Wm Willis	320 Sansome
Buckeye W & H M Co	Cal	3	20	Nov 4	Dec 11	Jan 4	W H Lowden	414 California
Caledonia M Co	Nev	33	25	Nov 29	Jan 4	Jan 25	R Wegeuer	327 Pine
Caledonia M Co	Dakota	9	80	Oct 2	Nov 11	Dec 6	D F Verdenal	309 Montgomery
Con Imperial M Co	Cal	13	10	Nov 3	Dec 8	Dec 29	W E Dean	309 Montgomery
Crown Point G & S M Co	Nev	43	50	Oct 17	Nov 18	Dec 10	James Newlands	327 Pine
Chollar M Co	Nev	5	50	Nov 9	Dec 14	Jan 4	W E Dean	309 Montgomery
Jackson M Co	Nevada	13	20	Nov 23	Dec 27	Jan 17	C M Shaw	408 California
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	Dec 10	C Van Dyke Hubbard	310 Pine
Maryland Con G & S M Co	Cal	2	25	Aug 13	Sept 15	Dec 18	E P Farnsworth	302 Sansome
Mackay M Co	Nevada	20	20	Nov 23	Dec 10	Dec 31	J M Litchfield	309 Montgomery
Mammoth M Co	Cal	6	25	Nov 3	Dec 6	Jan 3	A W Rose, Jr	309 Montgomery
Sierra Nevada M Co	Nevada	60	1 00	Nov 11	Dec 16	Jan 4	E L Parke	309 Montgomery
Real Del Monte M Co	Nev	13	25	Nov 5	Dec 9	Jan 3	C Van Dyke Hubbard	310 Pine
Monie G M Co	Cal	9	50	Oct 13	Nov 19	Dec 9	W H Lent	309 Montgomery
Occidental Con G M Co	Cal	24	15	Oct 11	Nov 13	Dec 3	D Thomas	327 Pine
Ophir S M Co	Nev	3	06	Oct 11	Nov 30	Dec 20	W T Smith	412 Montgomery
Ophir S M Co	Nev	38	1 00	Nov 5	Dec 10	Dec 30	C L McCoy	Nevada Block
Original Gold Hill M Co	Nev	9	1 00	Nov 29	Jan 5	Jan 24	J M Litchfield	309 California
Original Gold Hill M Co	Cal	23	10	Oct 13	Nov 17	Dec 14	J M Litchfield	415 Montgomery
Tellurium G & S M Co	Cal	23	10	Oct 13	Nov 17	Dec 14	J M Litchfield	415 Montgomery
Tioga M Co	Cal	12	15	Dec 30	Jan 4	Jan 24	W H Lent	309 Montgomery
Union Con S M Co	Cal	15	1 00	Nov 13	Dec 16	Jan 3	J M Litchfield	309 California
Utah S M Co	Nev	32	2 00	Nov 4	Dec 9	Dec 29	G C Pratt	309 Montgomery
Yellow Jacket M Co	Nev	39	1 00	Oct 6	Nov 10	Dec 8	Mercer Otey	Gold Hill Nevada

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Argenta M Co	Nevada	6	10	Nov 20	Dec 22	Jan 12	E M Hall	327 Pine
Arizona Prospecting & M Co	Arizona	2	05	Oct 8	Dec 4	Dec 22	C E Travers	331 Montgomery
Armand G & S M Co	Cal	2	02	Oct 21	Nov 30	Dec 20	J L Fields	240 Montgomery
Belmont M Co	Cal	26	15	Oct 9	Nov 15	Dec 13	J W Pew	310 Pine
Crown Point G & S M Co	Cal	43	50	Oct 7	Nov 18	Dec 10	James Newlands	327 Pine
Cabore M Co	Mexico	2	20	Oct 13	Nov 17	Dec 15	E B Holmes	309 Montgomery
Commonwealth Con M Co	Cal	4	10	Nov 12	Dec 16	Jan 5	Chas A Morse	217 Sansome
Cumberland G & S M Co	Arizona	2	30	Oct 27	Nov 30	Dec 24	J H Griffiths	328 Market
Excelsior G M Co	Cal	13	10	Oct 20	Nov 24	Dec 15	D B Chisholm	327 Pine
Eagle S M Co	Cal	15	10	Nov 16	Dec 15	Jan 15	J E Byrne	533 Kearny
Iowa M Co	Nev	11	03	Oct 13	Nov 15	Dec 6	Wm Gillespie	411 California
May Flower G M Co	Cal	9	10	Nov 11	Dec 14	Dec 31	J Morizo	328 Montgomery
Mt Potosi Cons M Co	Nevada	5	25	Oct 12	Nov 15	Dec 6	E A Holmes	316 Pine
Maryland Con G & S M Co	Cal	2	25	Aug 10	Nov 30	Dec 30	E P Farnsworth	302 Sansome
Orion M Co	Cal	6	10	Nov 15	Dec 18	Jan 18	Wm Stuart	320 Sansome
Silver Hill M Co	Nevada	13	30	Nov 16	Dec 21	Jan 11	W E Dean	309 Montgomery
San Jose M Co	Nev	17	20	Oct 12	Nov 2	Dec 7	A Carrigan	109 Front
Tuscarora M & M Co	Cal	7	16	Oct 30	Dec 4	Dec 27	M F Sperling	309 California
Wide Awake Prospecting M Co	Nevada	14	10	Oct 13	Nov 25	Dec 10	C H Childers	222 Sutter
Wyoming & Dakota W Co	Dakota	3	20	Oct 28	Dec 7	Jan 3	Theo Widman	404 Montgomery
Windsor M Co	Nev	1	071	Nov 17	Dec 22	Jan 17	O E Elliott	327 Pine

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Butte Creek Hydraulic M Co	Cal	R L Taylor	230 Pine st	Annual	Dec 6
Elntracht G M Co	Cal	H Kunz	Cor California and Kearny	Annual	Dec 7
Horsehoe M Co	Arizona	O DuPy	315 California st	Special	Dec 14
Gipsy Queen M Co	Cal	Bill Edwards	320 Pine st	Annual	Dec 15

LATEST DIVIDENDS-WITHIN THREE MONTHS</

It is about 4 ft wide. The percentage of silver in it is lighter than has been the case in other parts of the ledge, and the gold is much more abundant, and the sulphur of a higher grade. The chert has been explored a distance of about 40 ft since its discovery, and is said to constitute the richest development ever made in the mine.

LOWELL HILL MINER.—The tunnel of the "Morgan" claim, above the town of Lowell Hill, is in between 1,500 and 1,600 ft, from which road gravel is being taken out. The new bedrock tunnel of the Swamp Key has 400 ft yet to run before striking gravel. The old tunnel was too high. The Dewey company's tunnel, now in 1,700 ft, will reach gravel within the next 250 ft. Nothing further will be done toward running the Planet company's new tunnel till the Dewey tunnel is completed, and the proper level at which to start is determined.

THE BALDWIN CLAIM.—The Baldwin gravel mining company, which has been working the Baldwin claim, during the past summer has been engaged in running a tunnel from Bloody Run into the ridge which separates that ravine from the Derby mining company's ground on this side. The tunnel, on which work has just been suspended for the winter, is now in a distance of about 200 ft. The owners estimate that it will tap the rich gravel deposits for which they are prospecting at a distance of from 100 to 150 ft of the ridge to a mile. The tunnel is said to extend down the vicinity of Lake City, and comprises 700 acres in all.

CONTRACT LET.—The Directors of the Peard Con. mining company have let a contract to Thomas Peard to extend the lower tunnel in their claim a distance of 100 ft further. It is now in about 35 ft.

CELEBRATING THE DEBRISS. It will be remembered that several months since the Transcript contained an item regarding a cave that occurred in the San Francisco company's copper mine at Spenceville, in this county, whereby much damage was done. We are now informed that for some time past the mine had been worked on the "cutting" method—that is, every energy was put forth to make the output for the time being as great as possible, without any regard to the future. The workings were intensively timbered. A number of the stockholders were wise enough to get out of the enterprise just before the cave, which was apprehended by the more watchful of them, took place, and as the stock was then in some demand, they made a good thing out of their interests. A force of men are now engaged in clearing away the debris preparatory to resuming regular operation in the mine.

FORBES' MINING STATE. The Blue Banks hydraulic claim at Moore's Flat was sold during the past week to Morton Alger and others, of Boston, Mass. The amount reported to have been paid for the property is \$50,000, which is, by those who are posted in regard to its value, regarded as a very reasonable price. H. A. Brigham, one of the best hydraulic miners in the county, assumes the Superintendency of the mine under the new management. Everything will be put in first-class shape this winter, and our informant says that by next spring a force of men, numbering in the neighborhood of 100, will be employed. The former owners of the claim were Jas. Reid, Wm. Rankin, Wm. Pride and Elisha Mills, all of whom are bachelors. Messrs. Rankin, Reid and Mills have held their interests for a quarter of a century past. Mr. Pride buying in about 6 years ago. The property has yielded them a steady income, although, owing to the old and extent of their operations, a comparatively small portion of ground has been worked over. The claim can be worked by either the hydraulic or drift process. We are not informed as to which the new company will adopt, but it will probably be the former.

SCOTIA.—Free Lance, Nov. 25: In sinking at the Scotia mine a fine stringer has been struck in the shaft, which is very fine in mineral, and of right size. The stringers are about 12 inches thick, and are almost vertical, which causes the shaft, which is perpendicular, to follow it for a good distance. The stringer is yet in the bottom, at a depth of 130 ft. Several of our best judges and most experienced mining men have examined the rock from the Scotia shaft, and they all pronounce it to be first-class ore for this old and reliable district of Grass Valley.

GOLD BRICKS.—San Francisco Chronicle, Nov. 27: We had in our hands on Friday of last week a bundle of golden bricks taken from the Boston mine at Moore's Flat, which we were told were worth about \$21,000. Mr. McMurray, the Superintendent of the company (Eureka Lake), had possession of it, and was conveying it to the express office when we saw it. That Boston mine is one of the best in the county.

DEADWOOD MINER.—Nevada Transcript, Nov. 24: A small shafting of ore from the recently discovered pay chute of the Deadwood mine has been made, the clean-up being highly satisfactory. The managers of the property are confident that the future career of the property will be a prosperous one. From the time that they lost the ledge till they found it again, about \$18,000 was expended in prospecting, and now they hope to get back that amount and a big margin besides.

SPENCEVILLE COPPER MINER.—Work has been resumed at the Spenceville copper mine in this county, a large force of men being employed. The vein is being stripped at the top preparatory to working the mine from the surface.

MILLING AND MINING MENTION.—The new Frue concentrator at the Pioneer mill will be ready to start up this week.

The Murchie hoisting works are nearly completed, and the Superintendent expects to raise steam this week for the first time.

ED. MOORE'S MINE.—On Little Deer creek, about a mile above the city, continues to show a very favorable prospect. The ledge is 10 inches thick, and very compact. Assays made by Prof. Price at San Francisco show the ore to contain 31.5% of gold and \$7.34 in silver per ton.

It was expected that the Derby mine would be cleared yesterday of the water that has interfered with operations there recently. As soon as the workings are dry, the extraction of the rich deposit of gravel that was struck just before the water came in will begin. The deposit in question is said to surpass anything ever before seen in the mine for richness and extent, and the owners naturally anticipate an early increase in the size and frequency of shipments.

PLACER.

THE OLD TAYLOR MINE.—Placer Herald, Nov. 27: Work on the old Taylor mine, south of town, under the management of Mr. Faulk, is being pushed right ahead. The east drift on the 50 level is being crowded forward, and the further they go east the better becomes the quality of the ore. Steam power is used for hoisting and pumping. A chute for loading wagons has been built at the shaft, which affords a great saving of time and labor. Their new mill, which Mr. Faulk's company is one of the best in the county, is kept running much all the time. A new boarding house for the mine has just been built.

THE BAKER MINE.—Dutch Flat Forum, Nov. 29: The company owning the Baker mine, at the lower end of town, have resumed work. There is now a force of 16 men at work running powder drifts, laying water pipe, repairing the hoisting derrick and preparing generally to commence hydraulic mining as there is there is sufficient water to start a good head of water in the ditches. The Baker mine is superintended by Mr. F. M. Chadbourne, and has Johnny Simmons, an able and experienced miner, as foreman. Work is progressing rapidly in all branches, with the exception of running powder drifts. The cement and gravel is so hard work is necessarily slow. It has been about 3 years since any work has been done in this mine, because of the property being in litigation, which has been settled, and work will be pushed along in the mine continuously from the present time. There has been large quantities of gold taken out of the mine and plenty more still in it.

PLUMAS.

NEW MILL.—Greenville Bulletin, Nov. 24: On Monday, while coming here from Honey Lake valley, we called at the new location of Pierce and McDow, near the foot of Diamond mountain, and some 6 miles this side of Susanville. They have a 5-stamp mill on the ground and the building nearly ready, and intend to have the stamps running in less than 2 weeks. Their mine is a ledge, and

quarter of a mile from the mill, and connected by a good road. The vein averages 9 ft in width, at the 150 level. They have also an amazing outfall, and will soon be prepared to assay on a large scale.

GOLD STRIPS.—The entire winter supply of provisions, powder, candles, etc., is being hauled to this mine, having come up from San Francisco.

INDIAN VALLEY.—The tunnel from the Union mine progresses well, and will soon be completed, so it will probably be but 3 or 4 weeks until they will be milling rock. **PURVIS NATIONAL.**—The new Buckhorn furnace mentioned last week is now in position, and nearly ready for operation. A test of sulphuric acid has been made by R. M. Wilson with remarkably satisfactory results, showing over \$100 to the ton.

GREEN MOUNTAIN.—The ditch repairs are nearly completed, the pipe and flume mostly ready, and but a few days will elapse ere both mills can commence running. The water will be conveyed to the water house and rock room are being filled to their utmost capacity.

CUMBERLAND.—The claim shaft which we mentioned last week as having been broken, has been repaired at the Greenville Iron Works. It was sent to the mill yesterday and the latter will now be enabled to commence running next week. This is a practical illustration of the value of a foundry, as, but for that, the shaft would have had to be sent to Graysville at a heavy expense, and a delay of 6 weeks or more would have been caused. A fine rock is still found in abundance in the Garfield shaft.

TUOLUMNE.

PROSPECTORS.—Tuolumne Independent, Nov. 27: The mining outlook for our county is brightening on account of the interest taken by outside capital, who are developing paying properties. We merely mention a few in our mind at present writing.

THE JUSTICE MINE. recently purchased by an Eastern company, is showing up a good property. This mine, south of Sonora, has never been prospected to any depth. It is a fine mine, and is owned by a New York company, runs at right angles and contacts with the great bonanza mine in town. The company are making preparations to open the mine in good shape before building a mill—which is the only sensible way to mine.

THE LOUISIANA MINE. near Cherokee, is handed to San Francisco capitalists, and the mine has yielded such favorable returns in their mill work it is almost assured the sale will be consummated at a heavy figure. A survey has been made following up the ledge to where it crosses the master ledge of the county, and its point of contact is found in the ground of the Mastodon mine, belonging to the Boston and Pacific Mining and Investment Co., an Eastern corporation, and we are apprised that steps are about being taken to sink a prospect shaft at the point of contact to thoroughly explore the two veins. It is well known where the vein enters the Louisa mine, and the Louisa and Mastodon meet, there is sure to be an extraordinary valuable mine discovered. Our Eastern friends are in luck, and we predict the opening out of a mine second to none in the county.

THE OLSEN MINE. at the southwestern end of the county, is turning out 64 lbs of amalgam every 24 hours with only 5 stamps. This is about 44 lbs of solid gold. Their 10 stamps will shortly start up and the value of the property will be paid for. The pay ore is extensive, and our county carries off the palm as having, in this newly discovered property, as of old, the boss mines of the State.

It is reported that the Little Gem mine below Jamestown, belonging to W. N. Harris, has been sold for \$100,000.

THE T. C. WATER CO. are improving their ditch property. A new boom has been built on the Strawberry reservoir, 540 ft long out of heavy cedar timbers 12x14 inches, and fastened together with heavy straps and chains. They have also built a new suspension above Long camp, 84 ft over all strings, 14x14 square, 34 ft long; braces and caps 11x11. When finished a full head of water was turned on, which is considered about 2,000 inches. It was bound together so tight—every brace fastened to caps and strings with heavy bolts—that it is only detached 1 inch. The company are substituting pipe for the high flume at Shaw's flat; 1,200 ft 11-inch pipe will do the work.

NEVADA.

WASHOE DISTRICT.

The following statements have been made by superintendents of leading mines November 22nd and 30th.

EVERMAN.—Winze has been sunk and timbered 21 ft; total depth 120 ft. Incline upraise has been extended 34 ft, through porphyry and seams of quartz. Forman shaft, total length, 1,520 ft; rock in bottom very hard and rough.

CALDERONIA.—The pumps have been run an average of 153 hours per day.

BENTON.—Have completed the repairs on the incline and are now making preparations for extending crosscut N.

CON. IMPERIAL.—Are overhauling the pumps from the 2000 level to the surface and repairing damage caused by the fire. The water on the 2800 level is up to the top of the drift.

CHOLLAR-NORRORSS-SAVAGE SHAFT.—Work going on as usual. The pipe for the hydraulic pumps has been received, and Monday or next day will commence putting it in.

UNION CON.—From the 2400 and 2500 levels 227 tons of ore, assaying \$23.65 per ton, have been extracted.

POTOSI.—The drift south on the 2400 level has been extended 48 ft in very hard rock. During the 24 hours ending this morning, the material through which the drills have been run show signs of getting softer.

OVERMAN.—Winze has been sunk and timbered 21 ft; total depth 120 ft. Incline upraise has been extended 34 ft, through porphyry and seams of quartz. Forman shaft, total length, 1,520 ft; rock in bottom very hard and rough.

UTAH.—The new incline pumps started on Monday, and everything about the pump line is working well.

COS. VIRGINIA.—During the past week 301 tons of ore have been extracted from the 1750 level stopes, of the assay value of \$20.80. On the 2300 level the south drift has been extended 29 ft. During the week bullion to the value of \$35,350 has been shipped.

UNION CON.—The crosscut west on the 2400 level is out 64 ft. During the past week 43 tons of ore, assaying \$38.45 per ton, have been hoisted from the 2100 level.

DUN GLEN DISTRICT.

IMPORTANT SALE.—Silver State, Nov. 23: John Wentworth and John Wright went to Dun Glen, 18 miles south of this place, in early days and engaged in mining. They secured some valuable locations, but in consequence of the almost total desertion of the camp, could not dispose of them, and they had not the means to develop them. They never lost faith in the camp, however, but remained there when nearly all but themselves had left. They shipped ore from their mines occasionally, from which they realized sufficient to supply them with the necessities of life. The success of the Lang Syne mine, which was then worked for 30 years, and was successfully attracted the attention of mining men to the camp. Among others who went there was D. N. Brown, of Paradise, who had experienced the vicissitudes of a miner's life. He examined the Auburn and other mines, owned by Messrs. Wright and Wentworth, and agreed to pay a stipulated price for them within a specified time. He went to Chicago, where he had formerly resided, and got capitalists interested in the speculation. They examined the mines, sampled the ores, and were satisfied with the result. They purchased the property of Mr. Brown, and yesterday the sale was closed by the payment of \$75,000 by the purchasers at Wells, Fargo & Co.'s office, and the signing and acknowledgment of the deeds. The purchasers are L. S. Hodges and Charles L. Luntz, of Chicago, and Geo. C. Barnard, of Deadwood, who intend to develop the property this winter and build a 20-stamp to work the ore in the spring. To his pluck in purchasing the property, and his energy in getting capital interested to develop it, as much as to the perseverance of Messrs. Wright and Wentworth in staying by their claims under adverse and discouraging circumstances, is due the credit of placing what the best judges of mines pronounce a veritable bonanza of the richest kind of ore in a condition to have

it worked, and to encourage others to develop their mines so that capitalists will take hold of them. Many good miners are of the opinion that within a year, or two years at the farthest, Dun Glen will be one of the richest mining camps in Nevada.

ESMERALDA DISTRICT.

REAL DEL MONTE.—Herald, Nov. 27: Last Friday evening the nose of the cast-iron balance-hob on the 300 level broke, and the surface-bob not having sufficient capacity to carry the amount of ballast required, could not run the pump, and the water is now 200 ft deep in the shaft, and all work is suspended (except some necessary repairs to the machinery) until a new nose-piece can be procured from below. The Union Iron Works have made the casting, and is now on the way here, and as it only weighs about 3,000 lbs, the Fast Freight Company can bring it from Carson in 24 hours, so that if nothing unusual occurs the pump will be running again tomorrow. The main shaft has now a depth of 575 ft. The rock in the bottom is getting harder, and appears to be changing somewhat in character.

MILL CREEK DISTRICT.

STUCK IR.—Standard-News, Nov. 24: Larry Hoge, one of the early prospectors of Bodie, has been out prospecting in Mill Creek for the past 10 days, and has discovered a very rich mine in that district. Five ft below the surface a good-sized body of high-grade ore was struck, and men are now engaged in taking out ore for reduction. Larry deserves his good luck, and his many friends will join us in the hope that he may realize a million from his new find.

SPRING VALLEY DISTRICT.

LOOKING WELLS.—Eureka Sentinel, Nov. 21: Mr. E. H. Rose came in last night from across Spring Valley. He reports the mines over there looking well, especially so in the 6-20 and Woodchopper mines. A strong force of hands will be put to work the first of next month. The ore is very rich over there, and they have a good quantity in sight.

ARIZONA.

GOLDEN EAGLE.—Globe Chronicle, Nov. 25: The tunnel on the ledge, which also forms the 100 level, is now run 600 ft, all the way in good milling ore, which fills the ledge from wall to wall; its width, as shown in the crosscuts and at the points where they are stopping being from 4 to 15 ft wide. The main shaft is 240 ft deep.

TOWNSHIP MILL.—This mill was erected to work the free gold ore from the Townsend mine, and since it started has been running very steadily with good results in bullion. Mr. Tucker, the superintendent, however, finds that there is considerable gold in the ore which the milling arrangements do not enable him to save, while all the silver in it of course goes away with the tailings. He informs us that the owners in New York are now making arrangements for a complete 10-stamp silver mill.

GEN. HOOKER.—This mine is in the Gold Hill section, and has the largest gold lode hitherto opened in that vicinity. A tunnel has been run 160 ft to crosscut the ledge; and about 40 ft from the entrance they came upon ore through which they have now run 120 ft, with no signs of the further wall. The gangue of the ore is an easily worked quartz, and contains its metal entirely in the shape of free gold, which can be easily saved. The 250 tons on the dump is good milling gold ore, as the 20 average assays made run \$120 per ton.

LOUISA.—This claim adjoins the Gen. Hooker, running diagonally towards it, and is on a rich streak of ore, which is from 8 inches to 1 ft wide.

RETRIEVE.—This claim belongs to the same owners as the Hooker and Louisa, and the croppings on the surface indicate a ledge over 12 ft wide. An open cut 10 ft broad and 20 ft deep is being made, looking gold ore, which has a quartz gangue and carries 60 per cent.

QUARTZENAL.—In the surface tunnel, in both shafts and on the 60 level, the ledge shows a continuous body of high grade milling ore over 150 ft long and from 2 to 4½ ft wide. The main shaft is 95 ft deep.

GREAT REPUBLIC.—This mine is on the southern side of the Pinal mountains, and has a parallel ledge to the Pioneer West, which adjoins. The main shaft is 33 ft deep, and shows a continuous streak of rich ore from the surface to the bottom over 20 ft wide. The ledge is much larger than shows in the shaft. At the bottom of the shaft they are now running a crosscut to strike the hanging wall, and are in 4 ft from the shaft and getting out ore. There is on the dump 70 tons of high grade milling ore.

COS. & COPLAN.—This mine is about 8 miles northerly from Globe, and a recent visit brought its value more than ever forcibly to our minds. The main ledge on the claim is a contact vein between granite and syenite, but has not yet had its size definitely determined, although from the surface croppings it must be about 20 ft. A working shaft has been sunk on it 64 ft, all the way down being in low grade ore. There are 3 other shafts 25, 80 and 100 ft deep, which have been sunk on spurs of rich ore which can be traced diagonally to the main ledge. The 80-ft shaft has yielded \$10,000, and the others also large amounts of ore which returned from \$400 to \$500 per ton.

THE LADY BOB.—This property was recently purchased by N. A. & J. L. Clark, with a party in New York, and is now being worked under supervision of N. A. Clark. It is situated about half way between Richmond basin and Chrome mine, and is making a showing highly gratifying to the owners.

CROWN IMPERIAL.—The pay streak on the surface is 14 inches, and at a depth of 10 ft widens to 24. Several assays made by Mr. Kennedy give results as high as \$700 per ton.

THE ARIZONA MEXICAN MILL is working steadily and turning out bullion regularly from the rich ore which is yielded so plentifully by the Mac Morris mine.

THE CENTRAL SILVER MINE. Co. last week shipped 4 bars of bullion, valued at \$4,900.

THE ISABELLA MINE is running right along day and night on Centennial ore, which, since they commenced to roast, yields handsome returns in bullion.

We learn from Mr. B. H. Snyder that arrangements have been completed for the erection of a smelter on the lower portion of the ledge, which is being worked on Mineral creek. Work has already begun. The value of these claims is evidenced by a recent shipment of ore to San Francisco, which yielded 43% copper and some silver.

IDAHO.

BOISE COUNTY NOTES.—Yankee Fork Herald, Nov. 20: The Crown Point shaft at Banner is down 210 ft, from the bottom of which a 140-ft tunnel tapped the vein. At the point where it was cut it is 3 ft wide. The mine is prospecting better than ever before. Jim Irwin and Ben Miller are handling the tunnel, and the mine is making a fine show of the more creek summit. The contractors are busy taking ore out of the Sun Rosa mine, near Idaho City. A tunnel is being run to tap the mine at a depth of several hundred ft, and it will soon be in shape for being extensively worked. The Gold Hill mill at Quartzburg is running right along on good ore. A large hatch of ore from the Ebenezer mine was lately crushed in the Territory mill, and turned out well. Work has been suspended for the winter on the Summit Flat mines. Wilson & Whitney, the owners, made a good deal of money out of them this year. There is only a small amount of snow at Banner, but the depth at the head of West Fork is nearly 3 ft.

BONANZA CITY.—Idaho World, Nov. 23: Bonanza City promises to be the richest camp in the Territory next year. Five mills will be erected next spring, in addition to the new one now going up. The Custer company will put up a 20-stamp to do custom work. The Lucky Boy and Badger companies will each put up a mill, and stamps will take the place of the arrastra at the Charles Dickens. The fifth will go up either on the Anna or Summit mines.

MONTANA.

MAGNA CHARTA.—Butte Miner, Nov. 23: Yesterday morning a very important development was made in the north crosscut at a depth of 266 ft. It will be remembered that near the latter part of last week, at a distance

of 50 ft from the shaft, several ore pockets were discovered which were regarded as indicative of the proximity of the ledge, and their richness in silver was so great that high hopes were entertained of the value of the main body when tapped. The face of the crosscut was pushed forward with renewed energy, and at a point 50 ft from the shaft, the miners passed through what proved to be a well-defined well, beyond which, after the firing of several more blasts, the ore body was found to lay. Neither the width nor the richness of the ledge has yet been ascertained.

NORTH STAR.—At a depth of 63 ft the east and west drifts are being extended with vigor, and are producing considerable ore. The drift running east is in 40 ft, and the one running west 35 ft. The ledge, though well defined, contains some worthless ledge matter, leaving the pay ore body not more than 2 ft wide. This is being extracted and shipped to the Copper mill which it keeps in constant operation.

ANSELMO.—The main shaft has attained a depth of 135 ft, and is still going down. In the west drift of the 100 level stopping continues on a body of ore which varies in thickness from 4 to 7 ft, and assays between \$125 and \$200.

COLUMBA.—The work of widening the 100 level to the full width of the vein having been finished, stoping of the east drift has been resumed, and sufficient copper ore to keep the smelter supplied is being extracted daily. That portion of the product which assays higher than 35% copper, is being sacked for shipment, the low-grade ore being conveyed by the air tramway to the smelter, where it is concentrated, desulphurized and formed into a matte.

AURIC.—On the 100 level considerable work has been done within the past season, but such is the magnitude of the ore reserves, that what ore has been taken out is scarcely missed, and makes very little difference in the dimensions of the ore bodies yet in sight. This drift has yielded considerable free ore lately, which has been used to mix with the product of the lower levels for experimental purposes. It is not considered likely, however, that the level will be extensively worked at present. The vein between these levels has been opened up to an average width of 15 ft, leaving heavy reserves on either side of the workings, which will be extracted and treated on the erection of the projected wet crushing mill some years hence. Between the second and third levels a change in the character of the ore is noticeable, the free ore having entirely disappeared. The 500 level is in splendid shape for working purposes, and considerable improvement is noticeable in the compactness and richness of the ore as compared with that of the upper levels. This fact is a most reassuring one, and goes far to show what may be expected when the ledge shall be tapped and developed from the 700-ft crosscut.

STEVENS.—This sterling property is opening up in excellent shape. The breast of ore in the face of the east drift of the new shaft is 2 ft wide, and is yielding rich ore, which lies clean and compact with well-defined walls.

OREGON.

GENERAL ITEMS.—Democratic Times, Nov. 21: Chas. Schultz has purchased Pony Hampton's interest in some diggings on Rich gulch. F. C. Ream will return to Pickers creek this week and commence preparations for mining his claim there the ensuing winter. T. L. Beck, of Willow Springs, was over to Hord's saw-mill, on Poorman's creek, this week ordering lumber for new flumes. He will commence shoveling in as soon as water starts. The Sterling company will extend its ditch 3 miles this season, which will bring water on some excellent ground. C. J. Howard has been engaged in surveying out its course. Keaton & Co. have worked out the ground laid bare by their windmill in Rogue river, with fair returns. They will take out the dam and suspend river mining for the winter season. Jack Layton is about enlarging and improving his old Williams creek ditch, that it will give him more water with which to work his diggings. He is making extensive preparations for the ensuing winter. Geo. Schumacher purchased his partner's interests in the Rockefeller ledge near Willow Springs, and will vigorously prosecute the work of prospecting it. Whenever the tunnel is completed crushing of ore will follow, as he has made arrangements to put up machinery on the ground before long.

UTAH.

SILVER REEF NEWS.—Miner, Nov. 21: Before the old year turns his toes to the daisies, the 20 stamps in operation in Silver Reef will have added their annual quota of nearly \$1,200,000 to the world's wealth of bullion. Assessment work is now progressing on numerous claims, and will be commenced on several more in a short time. The bullion shipments from Silver Reef, through Wells, Fargo & Co., from the 11th of November to the 17th inclusive, aggregate the sum of \$22,520.91. The contract for sinking a 60-ft shaft on the Empire mining claim, situated on the lower portion of the White rock ledge, has been awarded. At this depth it is expected to strike a ledge of high grade ore, which crops out at other points of the claim, and, should this be the result, the Empire promises to develop into a mine second to none in the district. Development is all that is necessary to convert several fine claims in the locality of the Empire into first-class paying properties.

THE PIONEER TELEPHONE.—The telephone pole to use in the mine in this district has been erected, and is, rather put down, in the Barbee & Walker, and proves to be a great convenience, and will soon pay for itself in time saved in communicating with the hoisting works on the surface. Previous to the introduction of the telephone, the only means of communication was by the ore-car, which involved the delay of loading when picks or tools were wanted. The telephone makes it possible for the ore mines is a new thing, but must be generally adopted for their convenience and economy being apparent.

THE LAST CHANCE MINE.—Salt Lake Tribune, Nov. 29: The Last Chance mine, at Bingham, which has long been known as the English Co.'s property, is about to start on a new career of prosperity. No property on the coast has a better record, and none promises a more brilliant future. The new management has a program of development. Recently the manager has purchased the Hooper mine, on the southwest, the Opulent and Silver Maid, and consolidated them with the Last Chance. These are splendid additions. We understand that all the necessary machinery has been purchased to commence and carry out the thorough opening of the property.

THE GILBERT MINE.—Salt Lake Tribune, Nov. 29: The Pacific coast at Mount Shasta, yesterday brought to the Tribune office a magnificent specimen of cinnabar, and laying it out on the reporter's table said: "I come to vindicate Prof. Newberry. That stone, according to this assay—showing an assay certificate—goes 13.12% in mercury, and the whole ledge runs from 2½ to 14½, and it is 40 ft wide. The ledge makes it a 20-mile wide, and it is in the same allowance. Coming down to the true business, the amount of ore is simply immeasurable. I have been working and holding on for 8 years. I have not been financially able to do all that I intended to, but I want the Tribune to state that when Prof. Newberry told an Eastern audience that there was mercury in Utah, and lots of it, he understood the real facts."

THE GILBERT MINE.—Old Telegraph is to commence operations shortly. It is rumored that a lease has been granted to Mullet, Stansfield and others. Twenty-five men are to be put to work, and the old mine will shortly resume its usual shipments. The Mary Lee, owned by C. H. Lashbrook, is working 2 men. A tunnel is now being run to tap the vein. It is in about 80 ft, and is 20 miles in length. John D. Smith, John D. Smith, and John D. Smith are working the plan of W. E. Blenny. The pay streak has been tapped and gold dust is now in order. Jones & Housholder are running a new tunnel on the Ashton. The ore extracted brings in the market about \$120 per ton. W. Delamore & Co. are working the Caledonia, the ore they are taking out is said to average 250 ounces of silver and 20% of gold. The mine is being prepared for a winter campaign. Lumber is being hauled up to the mine to erect a house for the men. W. E. Blenny is opening out his lead and silver vein of the Overland. The vein looks strong and is widening out; assays pay out A. 1.

West Coast Land Birds.

Introductory Remarks.

We intend to give our readers a series of articles on the influences, both good and bad, exerted by our land-birds on the cultivation of all kinds of crops along the Pacific slope. The articles will be prepared by one who has made them a special study for twenty-five years past. We intend to reproduce the engravings, of such birds as we shall select, from the "Ornithology of California," one of the reports of the State Geological Survey. Fuller accounts of all the species may be found in the "History of North American Birds" by Baird, Brewer, and Ridgway, three volumes, quarto, 1874. The articles themselves, however, will be entirely new, and will contain much original matter never before published, besides the necessary quotations from other authors. We cannot definitely announce when other articles of the series will appear,

in their places. Very little observation will show that such hills can only be used to catch insects, or to pick a little at soft fruits. All these birds are smaller than the meadow-lark. Leaving the characteristics of the other groups to appear, in their proper places, we proceed to describe the families and species.

The Thrush Family.

According to the latest classification, these birds and their relatives present us with the most typical examples of the bird-form known, for their structure shows the least approach to that of the reptiles below them, and the mammals above them, in the scale of development. They are therefore placed by most authors at the head of their class. We have not yet learned on what principles to divide it, so as to arrange the families in regular order from the lowest to the highest, with these at the middle of the series, while those nearest to the lower and higher classes may be the ones at each end.

American Thrushes.

The typical genus of the family is that to

More interesting to us is the "Oregon thrush," Fig. 2, described from that State, but now found to be very common throughout California in summer, except along the large interior rivers and in woodless tracts. It is over seven inches long, uniform reddish brown above, somewhat olive toward the tail, the breasts with spots darker than the back but not black. The pale brown tints gave origin to its scientific name which may be translated, scorched thrush (*Turdus ustulatus*, Nuttall). There is, however, an eastern variety known as the olive-backed thrush which is nearly of the same tint as the hermit, differing chiefly in absence of reddish on tail, etc., (variety *Suainsoni*). This form is common in the Rocky mountains, and has been reported to visit California occasionally in its migrations.

Our summer thrushes are, however, more or less of the burnt-brown tint, and are among our most melodious singers, their metallic ringing notes resounding in spring from the thickets along every stream near the coast, and in the high mountains, especially toward evening,

similar plumage, but there are two of our species still larger, with much heavier bills. The first is known everywhere in America by the name of robin, from its red breast, though in size and shade of red the English robin is very different, more like our bluebird, which it also resembles in habits. Though so different in plumage from the typical thrushes, this robin-thrush, when young and newly fledged, has its breast whitish, thickly spotted with black, resembling very much the fieldfare, a thrush of Europe, but after its first moult loses the spots and becomes red-breasted, thus developing to a grade higher than the spotted ones. The adult male has the head black, except three white spots about each eye, and a white-spotted throat; back olive-grey wings and tail blackish-brown, the outer tail feathers with white patches at ends, lower parts about the tint of redwood, white under tail, bill yellow. Female and young birds less brightly colored. Length 10 inches.

The robin, so well known in the Eastern States, is a rare bird in most of the older set-

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

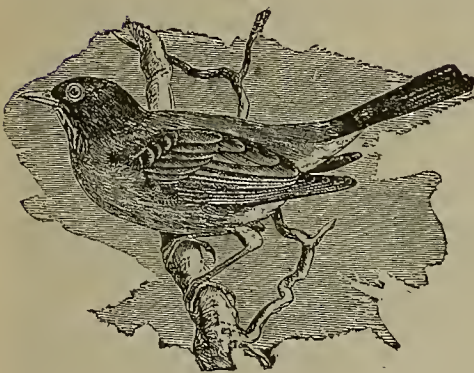


Fig. 5.

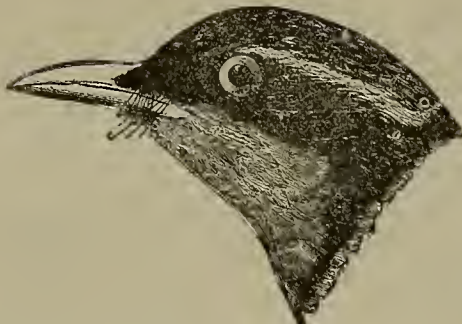


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



WEST COAST LAND BIRDS—THRUSHES, ROBINS AND MOCKING THRUSHES.

but we trust they will not be long delayed. The plan to be followed, though in the same order as in the Ornithology of California, will not be so strictly scientific as to unfit it for popular reading, while at the same time, none of the practically scientific views of the subject will be omitted. According to modern classification the land-birds are arranged nearly as follows, from the agricultural point of view: 1, insectivorous singers; 2, graminivorous singers; 3, omnivorous singers; 4, fly-catchers; 5, grub-eaters; 6, vermin-killers; 7, game-birds.

In this order it is proposed to describe briefly each bird, and to give its habits more fully. These divisions do not agree strictly with scientific classification, which is founded on structure more than on habits, but the place of any bird in the above arrangement can be generally ascertained by the figures and brief characteristics given.

1, Insectivorous Singers.

The first division includes those with rather short and slender bills of about equal breadth and height at the base; straight when short, much curved when longer than the bird's head. The mocking-birds, wrens, titmice and hutchers-birds, furnish us with examples of various forms of the bill found in this division, and

which the true thrushes belong, of which we read in English books, but which are somewhat different from their American consins. The European thrushes are among the finest song-birds of that continent, and are fully equaled by some Atlantic coast species, as for instance the wood-thrush, and by the hermit-thrush.

The latter only visits us, and to some extent winters in California, going north of the United States in summer and never favoring us with its brilliant song, although some will probably be found to linger through the summer about our highest snowy mountains, as they do in the Rocky mountains above 8,000 ft. altitude.

The western hermit-thrush (*Turdus nanus*, Audubon, meaning dwarf thrush), Fig. 1, is the smallest of American species, about 6½ inches long above light olive brown, becoming reddish toward the tail, beneath white, with a huffy tint on breast, which is thickly spotted from the sides of hill downward with triangular dusky spots more rounded beneath. It is a very shy bird while with us, though occasionally coming around shrubbery in gardens, seeking insects chiefly on the ground, and entering only a sharp chirp of alarm. Varieties of this species are found in the Rocky mountains much larger, and one of intermediate size in the Eastern

when they delight to visit gardens and seek for insects until dark. They may occasionally pick a cherry or other small fruit, but are among the gardeners best friends, from their destruction of insects, and should be protected. Among our boys of foreign parentage, they are often called whistlers and sometimes even nightingales, but are much inferior in musical power to the other species mentioned before, their song being of but a few notes often repeated, and their alarm note a whistling though loud chirp.

The nests of this bird are built on low bushes or trees, of wet leaves and twigs, warmly lined with root-fibres, and often covered outside with green moss, the walls very thick and solid, the cavity deep. The eggs are bluish-green, varying in tint and in the amount of light or dark-brown blotches that nearly cover them.

Those of the hermits, as far as known, are without spots, and their nest is built on the ground. This bird, after its summer residence as far north as Alaska, returns to California about the end of September, and remains here until April, while the Oregon thrush arrives from Mexico in April, and stays with us until September.

American Robins.

The little thrushes just described are surpassed in size by the Eastern wood thrush,

which they delight to visit gardens and seek for insects until dark. They may occasionally pick a cherry or other small fruit, but are among the gardeners best friends, from their destruction of insects, and should be protected. Among our boys of foreign parentage, they are often called whistlers and sometimes even nightingales, but are much inferior in musical power to the other species mentioned before, their song being of but a few notes often repeated, and their alarm note a whistling though loud chirp.

Their lively and varied songs, with their confiding habits in places where they are protected, make them universal favorites, and often save them from the slaughter too hastily pronounced against so many other birds. They are often kept in cages, and become very interesting pets, learning to imitate various tunes and sounds heard around them.

Their nest is built, like the thrushes, in a low tree, or sometimes in a building, but made more solid by a layer of mud, which dries like mortar, and the eggs are dark bluish-green, unspotted.

Being hardy birds, they winter even where snow covers the ground, living on wild berries and wandering about in large flocks, from which they have derived their scientific name (*Turdus migratorius*, Linnæus), Figs. 3 and 4. Western birds differ from Eastern only in longer tails and more extensive white patches, especially

The Western, or "Oregon" robin (though not well named as we have also the Eastern kind just described), is called by authors varied thrush, a translation of its scientific name, (*Turdus naevius*, Gmelin), Figs. 5 and 6. It is the handsomest North American species, being slate-colored above the lower parts, with a stripe behind the eye and two bands on each wing rich orange chestnut; the breast crossed by a black band; beneath tail and ends of tail feathers, white; female duller; length a little less than that of the robin; bill black; feet yellow. This beautiful bird is only a winter visitor among us, going in summer even to Alaska, where they are said to have a brilliant song and habits much like those of the robin with which they associate while here, though more silent and shy. They arrive here in October and leave in April. Large flocks of this and the common robin arriving early in fall indicate a cold and wet winter.

Mocking Thrushes.

Although at first sight the well-known mocking-bird does not look very much like the spotted thrushes or the robins, there is a link connecting them found in the arid "sage-brush" regions of California and eastward to the great plains, called the Mountain mocking-bird (*Oreoscoptes montanus*, Townsend), Figs. 7 and 8. This bird is 8½ inches long, brownish-ashy above, dull white below, thickly marked with triangular spots, the wings and tail brown, tail feathers white tipped, bill brown, white below, feet elaty, soles yellow. Thus plainly colored, it is well suited for concealment among the gray shrubbery of its native haunts, where it is one of the few fine singers that enliven the dreary waste with songs of great variety and sweetness. They live on insects and berries; migrate but little, and lay dark green eggs spotted with brown.

The true mocking-bird, of which the scientific name means many-tongued mimic (*Mimus polyglottus* Linnaeus), is more common in southern California, but many are kept in cages in the northern part of the State, Oregon, etc. These western birds showed tendency to variation from the eastern in having tails more lengthened, as have many other western forms of birds familiar to settlers from the East. They do not, however, vary in plumage, which is ashy-brown above, brownish-white beneath, wings and tail brownish-black, with two bands of white across wings, and white tips to tail feathers. Length, 10½ inches, of which the tail is 5½; bill and feet black, eye yellow. They inhabit the thickets of tall cacti and other thorny plants, feeding much on their fruits, and building a large, loose nest among them, in which they lay four or five pale green, brown-spotted eggs. They migrate only from the more northern part of their range, which is near lat. 33° in the San Joaquin valley, and to 42° or more on the Atlantic coast. Their wonderful powers of imitation are well known, and excel those of any other bird, except a few closely allied tropical species. Not being numerous anywhere, and of a shy disposition, they do little if any injury to fruit.

I now come to a genus of birds that would appear, in some cases, too different to be classed with the thrush family, yet we find it linked to them by a regular chain of species, gradually differing more and more. They derive their generic name from the remarkable bow-shaped bill found in the California species, but which dwindles down to near that of the robin in the southern and eastern forms. They all have some of the mocking power, and are often called false mocking-birds; sometimes thrashers (a corruption of thrushes). The common California species, Fig. 9, from which the generic name was first given, might better be called *Reaper* than thrasher, as its bill is nearly sickle-shaped (a form however now scarcely known to American farmers), or more properly perhaps, horn-hook shaped. Bow-bill is, however, nearly enough correct, and translates the scientific name of the genus, *harporhynchus*, while the specific name of this one is *ridivivus*, as named by Dr. Gambel, to express its "revival from oblivion." It appears that the celebrated voyager, La Perouse, during his circumnavigation of the world, about 1790, obtained this bird in California, and it was described and figured in his narrative in 1797, under a French name, after which it was unknown to naturalists until Dr. Gambel obtained it here in 1843.

Our bow-bill is 12½ inches long, wing 4 1-5, tail 5½, bill over 1½, legs about the same, so that the length of bill at once strikes the observer as oddly proportioned for a singing bird. Above, olive-brown; beneath, pale cinnamon, deepening into reddish-brown under tail, more like black on the breast. This plain plumage is exactly suited to the dry thickets the bird inhabits, where it scratches with its long bill among the dry leaves for the insect food which is its almost entire subsistence, merely varying this diet occasionally by fruits in their season. It is a very shy bird, living chiefly in the shrubbery tracts called by the Mexicans, "chapparel" and "chemisal," which grow usually in poor, gravelly soil, and thus keeps away from the most cultivated districts.

I have known them, however, to inhabit a willow grove around a large spring, and quite near a farm-house, where their varied and lively songs were among the most pleasing in the choir of feathered musicians that enlivened the early morning during the first six months of the year. This song is composed chiefly of imitations of those of other birds, and in the northern mines, where the true mockers are not

eggs also resemble those of the mocking-birds very closely.

Among the sand hills and rocky barrens that constitute the desert region between the Coast range and the Colorado river, where low, thorny bushes occasionally grow with cactus and yuccas, there is found a variety of this bird which shows the effect of the hot arid climate in being of a light grayish ash color above, paler below, but the tail darker below than above where exposed to more light. It is also about one-sixth smaller.

Still farther east, in Arizona, is a larger species, scarcely different from ours, but lays unspotted eggs, while toward Mexico appears two or three other kind, with breasts more or less spotted, like that of the thrushes. The bill in these is also shorter and straighter than in ours, until in Texas appears the well-known Eastern species called the "brown thrush" or thrasher (*Harporhynchus*), a rare straggler to California, of a bright rufous color, white below with black spots, forms a connecting link again with the typical thrushes.

USEFUL INFORMATION.

How to Make and Use Glue.

A writer in the *Furniture Gazette* gives some practical hints on glue and gluing. His method of making the common cement is as follows: Break the glue into small pieces, put it into an iron kettle, cover the glue with water, and allow it to soak twelve hours; after soaking, boil until done. Then pour it into an air-tight box; leave the cover off until cold, then cover up tight. As glue is required, cut out a portion and melt in the usual way. Expose no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue. He adds: All the glue as received from the factory requires the addition of water before it will melt properly, and every addition of water (while the glue is fresh made) will, up to a certain point, increase its adhesiveness and elasticity. Some glues will bear more water than others; but all will bear more water than usually falls to their share, and that, too, with a greater improvement in the quality of the work. For glue to be properly effective, it requires to penetrate the pores of the wood, and the more a body of glue penetrates the wood the more substantial the joint will remain. Glues that take the longest to dry, are to be preferred to those that dry quickly, the slow-drying glues being always the strongest, other things being equal. Never heat made glue in a pot that is subjected to the direct heat of the fire or a lamp. All such methods of heating glue cannot be condemned in terms too severe. Do not use thick glue for joints or veneering. In all cases work it well into wood in a similar manner to that painters do with paint. Glue hot surfaces of your work, excepting in case of veneering. Never glue upon hot wood, or use hot cauls to veneer with, as the hot wood will absorb all the water in the glue too suddenly, and leave only a very little residue, with no adhesiveness in it whatever.

Turpentine not a Drier.

Oil, or spirits of turpentine is generally supposed to be a drier, and is used as such, while in fact it is only a thinner and has no drying properties in itself. This has been repeatedly proved in various ways, but the following simple experiment will suffice: In two vessels of equal size and shape put equal quantities of linseed oil, and with one mix a quantity of spirits of turpentine. Allow both to be exposed to the same atmospheric influences and watch them. Very soon you will find the quantity in each vessel to be alike, showing that the turpentine has entirely evaporated, after which, if you can perceive any difference in the rapidity of the drying between the two, it will be in favor of what was originally the pure oil. When a mixture of linseed oil and spirits of turpentine is spread out over a surface, the effect is produced which has led so many to call turpentine a drier.

The turpentine rapidly flies off, and the oil is left in a much thinner body than if it had been applied pure, and the air has so much the better chance to operate on it, but the turpentine has left nothing behind to aid the hardening or drying process. Painters like to use it because it makes the paint flow more readily, work easier and spread out better. For inside work it is desirable, because as the rule the object is to apply to the surface covered as little oil in proportion to the pigment used, as possible, while for outside work the reverse is the case. Turpentine and benzine are almost identical in their mode of action, the benzine being the more volatile and escaping the more quickly. Neither should be used for the outside of a house, but for the inside they answer not only the purpose spoken of above, but, as they evaporate a "flat" surface, as it is technically called, is formed, and this is generally more highly esteemed.—*Ex.*

TO FIND THE CAPACITY OF A HOPPER.—Multiply the length by the breadth, and this product by one-third of the depth measuring to the point (in inches), and divide the last product

Roasting with Hot Water.

A most novel and interesting experiment is now being conducted at 256 West 125th street, New York city, where the Prall Union Heating Co., have erected a plant to demonstrate the principles involved in their system of supplying steam for power, or for heating purposes, and heat for cooking purposes. An ordinary steam boiler is used to heat water to a temperature of about 400°. This water is supplied through pipes to an oven around which it circulates, giving to the oven a heat which is sufficient to roast, bake, or effect any of the cooking results usually obtained with an ordinary cooking range.

It has been found from practice that an ordinary mutton chop required 7½ minutes to broil, and a piece of beef about 1½ inches thick, weighing about 1½ lbs., was overdone after being in the oven 19½ minutes. In both cases the meat was fairly browned, possessing all the characteristics of meat roasted or broiled in the usual manner.

The operation of the oven is simple in the extreme, nothing to do but turn on the hot water and the oven is ready. This system possesses several prominent advantages over the common range. In the first place the heat of the oven is more uniform, in fact, quite uniform, and it is simply a matter of experience to know exactly how long it will require to cook a joint of a given weight. In the next place, there is no danger of the oven getting either too hot or too cold, hence the trouble of managing and regulating the fire is dispensed with. Again, the oven is always ready, day or night. We understand that it is the intention of the company to supply with their ovens all the appliances necessary for conducting all culinary operations. In the experimental plant the ordinary house boiler is heated from water that has passed around the oven, and this without the least noise. The operation is as simple and efficient as can be, possessing, like the oven, the advantage that it is always ready for use, and the further advantage that hot water can be had at an equal temperature even though the faucet is kept constantly running for use. These demonstrations are well worthy of attention, their simplicity and effectiveness being quite remarkable.—*Scientific American.*

GOOD HEALTH.

Rapid Breathing as an Anæsthetic.

Dr. Bonwill, in a paper read before the Philadelphia Medical Society, and reported in the *Medical Times*, stated that in dental and other operations not requiring more than 20 or 30 seconds he had found that persons could be rendered insensible to acute pain by rapid breathing, carried as far as 100 respirations in the minute, consciousness and general sensibility remaining intact. The patient feels every touch, and in order to be exempted from pain the inspirations must be kept up vigorously during the whole operation without stopping for an instant. It is difficult for a person to respire more than 100 times in a minute, in consequence of the exhaustion produced, and for a minute after the end of the process he cannot breathe more than once or twice, and a very few can raise hand or foot. During the last four years, Dr. Bonwill, by employing this plan in dentistry, has been able to do without any anæsthetic; and in major operations less of an anæsthetic is required when rapid breathing has first been employed, the after-effects also being much less unpleasant.

The New York *Medical Record* remarks on the above: A perusal of the papers and discussions on this subject leads to the conclusion that there may be something of practical value in Dr. Bonwill's discovery. It seems that analgesia to a greater or less extent can be obtained by it; but its practical usefulness is not so well established. A good many failures have occurred, but the method is so simple that there ought to be no trouble in determining its exact value. The most favorable position for the patient is lying down on the side, and it is generally best to throw a handkerchief over the face, so as to prevent his attention from being distracted. He should then be directed to breathe at the rate of about 100 respirations in the minute. The direction best given is to "blow out" in rapid, puffing respirations. At the end of from two to five minutes, the patient continuing his rapid breathing all the while, teeth may be drawn or incisions made, and there will generally be an entire or partial absence of pain, which will last 30 seconds or more. According to Drs. Garrettson, Hewson and Kite, it takes from one-half to three-fourths less of the liquid anæsthetics to produce insensibility when their administration has been preceded by rapid breathing.

FOR CHAPPED HANDS.—A good preparation for chapped hands is composed of quince seeds and whisky. There is no rule as to proportion. Put the seeds in a bottle, and pour in enough whisky to cover them. As this thickens, add more whisky, until it is of the right consistency. This healing preparation is far superior to glycerine, as it dries off quickly, and leaves a most agreeable odor. Try it, and you will never be without a most valuable addition to your medicine chest.

Baby's Bow Legs.

These need not cause anxiety in all cases. If the child is healthy and has good, nourishing food and pure air—the two great essentials for making good blood—it will probably outgrow its bow legs naturally enough as its strength increases. Rubbing the legs with your hands in the morning may help to strengthen and to straighten them, holding them straight as you rub them. If the case is pretty bad, the two legs may be bound together with comfortable bandages during sleep, rubbing them well before and after binding them. If the child is quite young, it may be kept from standing on its feet for a few months, giving nature time to straighten the crookedness while the limbs are growing stronger. A carriage and a high chair are helps toward carrying out the plan.

All the things that have been mentioned as curative agencies may be used as preventives. A healthy child, with wholesome food and pure air to breathe, if kept from standing and walking while too young and weak will not have bow legs. Scrofulous children are more likely to suffer in this way, and those that are very fleshy. Don't take pride in your fat baby. Excessive fat is really a disease, instead of a sign of health. Fatten your pigs as much as you fancy, but do not deliberately fatten your children. Give them plenty of good, growing food, and they will be plump enough for symmetry, and not too heavy for comfortable activity. It is no wonder that the little legs bend under the heavy weight of some fat little toddlers. Such children should not be encouraged to stand or walk until they have grown strong enough to do so of their own accord, and then should not be allowed to walk too much.—*Sanitarian.*

Cold Feet and Sleeplessness.

A writer in the *British Medical Journal* thus discourses on the above subject:

The association between cold feet and sleeplessness is much closer than is commonly supposed. Persons with cold feet rarely sleep well, especially women. Yet the number of persons so troubled is very considerable. Cold feet are the bane of many women. Tight boots keep up a bloodless condition of the feet in the day, and in many women there is no subsequent dilatation of the blood-vessels when the boots are taken off. These women come in from a walk, and put their feet to the fire to warm—a most effective way to cultivate chilblains. At night they put their feet to the fire and have a hot bottle in bed. But it is all of no use; their feet still remain cold. How to get their feet warm is the great operation of life with them—in cold weather.

The effective plan is not very attractive at first sight to many minds. It consists in first driving the blood vessels into firm contraction, after which secondary dilatation follows. See the snowballer's hands. The first contact of the snow makes the hands cold, for the small arteries are driven thereby into firm contraction, and the nerve-endings of the finger-tips feel the low temperature very keenly. But, as the snowballer perseveres, his hands commence to glow; the blood vessels have become secondarily dilated, and the rush of warm arterial blood is felt agreeably by the peripheral nerve-endings. This is the plan to adopt with cold feet. They should be dipped in cold water for a brief period; often just to immerse them and no more, is sufficient; and then they should be rubbed with a pair of hair flesh-gloves, or a rough Turkish towel, till they glow, immediately before getting into bed. After this, a hot water bottle will be successful enough in maintaining the temperature of the feet, though, without this preliminary, it is impotent to do so. Disagreeable as the plan at first sight may appear, it is efficient; and those who have once fairly tried it, continue it, and find that they have put an end to their bad nights and cold feet. Pills, potions, lozenges, "night caps," and all narcotics, fail to enable the sufferer to woo sleep successfully; get rid of the cold feet, and then sleep will come of itself.

THE DIARRHŒA OF INFANTS.—During one of the discussions on the alimentation and disease of infants, which now occupy so much attention in France, M. Jules Guérin stated that the addition of a little charcoal (about half a teaspoonful of Belluc's or other finely-powdered charcoal) to a nursing-bottle full of milk exerts a most remarkable curative effect upon the diarrhœa of infants. He has repeatedly seen children who had become exhausted by seven or eight days' duration of an obstinate diarrhœa regain all the appearance of health in two or three days. At the same time that the charcoal is added, the milk should also be diluted with a half or a third of sugared water, the children taking the mixture without any repugnance, and no vomiting being induced.

TO MAKE LEECHES TAKE HOLD.—In the *Philadelphia Reporter* the following plan is commended as effectual in all cases when the leeches are healthy. Put the animals in a small glass vessel half filled with water. The part of the body which is to receive them is carefully washed with warm water, and the glass is quickly inverted upon the skin. The leeches attach themselves with surprising activity. When all the animals have bitten, the glass is carefully removed, the water escaping being absorbed by a sponge. If a single leech is to be applied, the same plan is adopted, using a test tube in place of a glass; by this means the animal may be compelled to bite at just the



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The Week.

The principal matter of local interest this week has been the rain, which began falling Tuesday morning, when a strong southeast wind set in, with a good downpour of rain. And this has been felt over a good portion of the State, so it is not so much of a local matter after all. The gravel miners will rejoice, for a few heavy rains like this will soak their ground and set their ditches running. They are all ready, and some have been waiting a month for the rain.

The current mining news of the week will be found in our "Mining Summary." From all portions of the coast we hear of vigorous prospecting and steady working of old claims. A stream of miners is flowing from many parts into Arizona and New Mexico. One of the Arizona papers this week warns miners not to come there seeking employment now. So many men have come into the Territory that the avenues of labor are pretty well filled.

The advance of the railroad in that direction, however, is going to bring to the front a grand mining section in that Territory and New Mexico. Old Mexico, too, will be traversed by the hardy prospector before long. The mountains of Sonora will be ransacked high and low before many years. The miners are the pioneers of civilization, and there is a large extent of country thereabouts in need of civilizing influences.

SWELLING CLAY.—They are finding some curious rock in the Suto tunnel, south header. The *Enterprise* says: The rock, however, is liable to give trouble hereafter, as it is of a kind that swells in an amazing manner. But that men are kept on watch to cut it out it would close in behind those who are at work in the face of the drift and completely imprison them. The men on one shift a day or two since worked like Trojans, taking out 45 carloads of dirt, and at the end of the shift the tunnel was not as long by 18 inches as it was when they started. The earth—which is a mixture of clay and boulders—came out at the face of the drift like the pith from an elder. Some of the men swore that there were fellows on the other side pushing it through. Those who have ever seen what

The Poor Man's Mill.

We do not often hear anyone say anything in praise of the hurro, yet the hurro, as any miner knows, is a most useful little animal in his place. He will not cut the dash that a trotter will; but he will live on less, do more work, cost less and be more patient under adversity. He will not go so fast as a trotter; but put him on a mountain trail with a pack, and he will kill half a dozen of the fancier breed. But people do not often praise him much. Probably because we are used to him. The telegraph informs us of all the movements of Maud S. or St. Julien, and how they heat time, etc. We never recollect having seen anything or any telegram about a hurro. He is, apparently, beneath the notice of the telegraph. But the country could get along very much better without Maud S., St. Julien and others of their kind, than it could without the hurro.

In the same way you do not often hear anyone say much about arastras. We hear a good deal about 10-stamp mills, and 50-stamp mills, and 80-stamp mills. They form subjects for a great many telegrams, and they have cost more than Maud S. a dozen times over, in many cases. Yet, for the miner, the working miner, in a gold country, they never have done as much as this simple old arastra. We are so used to these that we are apt to ignore their merits. Half the time we do not use them when we can; looking upon them as primitive implements.

And yet the arastra, with all its great rudeness, is worthy of praise. It is the poor man's mill. A mule is cheaper than an engine; his grub costs less than coal, and a cluh or black snake is equal to an engineer, at the same time costing less. You run your own mill and pay no money out to mill companies. What gold comes out of the rock you get and you do not have to divide on it as some mills make you do without your knowledge. With free gold an arastra will heat the best mill ever built, in results. Amalgamation is more satisfactorily accomplished in an arastra than in the finest quartz mill. You do not break down and have to wait for "castings," and you never have to build a big house to cover in your machinery.

You build your own mill in the first place; get out the rock; hew the timber, and set the whole up. When you run it you are your own engineer, foreman, amalgamator, feeder and superintendent. You boss the job yourself. You can stand at one side and break the rock, and keep the mule going by throwing pieces at him. If anything goes wrong, a single "whoa" stops all the machinery immediately and quicker than any engineer and throttle ever stopped a quartz mill. If you go away a few minutes there is no danger of anything blowing up or going wrong, for the mule will stop and the whole outfit remain quiet waiting your return.

You have no insurance to pay. There is no great loss on equipment if the ledge "peters" on you. You are independent of custom mills, and know what is really in your rock. You haven't any very big water bills to pay.

Any miner of common intelligence can learn to run an arastra easily enough. There is not much of any science about it, but a good deal of common sense.

If miners in camps where the ore will admit of it, would go to work with their own arastras instead of waiting for capital or for mills, we would have more prosperous camps and more well-fixed miners.

QUARTZ MILL BURNED.—On the 29th ult., the works of the Scadden mine, below Boston ravine, Grass Valley, were burned. The entire establishment was destroyed, consisting of a large building, in which were two stationed engines, and the mill building attached, with two five-stamp batteries, pans, sluices, and all the necessary outfit. Beside destroying the buildings the fire communicated to the wood work of the shaft, which was burned down a distance of about 30 ft.; but its further progress was subsequently stopped by conducting a stream of water down the shaft from an adjacent ditch. The pumping engine was a powerful machine, formerly in use at the Pennsylvania mine at Brown's valley, Yuba Co. It is badly damaged, and perhaps ruined. The smaller engine, for driving the batteries, does not seem in as bad a condition. The mortars of the battery can be used again. The works were erected less than two years ago, at a cost of \$21,000, and were considered cheap at that price, as the machinery had been purchased at a low figure. The property was insured for \$6,700.

STILL ANOTHER.—Suits continue to be brought by stockholders against officials who fail to file their reports required by law. Chas. A. Trowbridge has commenced suit against H. Bartling, E. Moreau, A. G. Hawes, W. O. Gould, and George W. Dietzler. Directors of the Oro Blanco mining company. The plaintiff, being a stockholder in the said company, charges the above named Directors with having refused, failed and neglected to post or caused to be posted the receipts or expenditures of the company for the months next preceding the first Monday of May, June, July, August, September, October and November, which failure and refusal is a violation of the statutes in such

Calaveras County Mines.

We had a conversation this week with Mr. T. R. Andrews, of Vallejo, Calaveras Co., from whom we learned some interesting items concerning the mines thereabouts. They are nearly all drifting and hydraulic claims in that part of the county, and they had a very good season till about October 1st, when the water was cut off in order to repair the ditch of the Union Ditch Co. The water comes from the north fork of the Stanislaus river, and the company supplies nearly the whole southern part of the county. The water is sold for seven cents per inch of 24 hours. This is rather high, the Tuolumne Ditch Co., in Tuolumne county, charging but four cents.

The Dogtown Mines

Are about two miles below Angels, the town of Dogtown being a small mining camp. The Monarch mine is the old Garibaldi, which was sold for \$40,000 to the present owner. They are drifting at a depth of 130 or 140 ft. They drift out a depth of 10 or 12 ft., and the mine pays very largely; some say in places, as high as five dollars and six dollars a carload. The "Bully-Bully," on the same lead, is also a rich mine of the same character. It is owned by Carlsy & Co.

There is a good deal of cement in this gravel, and it cannot be washed till prepared. It is drifted out and hoisted to the surfices, and spread out till it dries. Then water is squirted over it, and it is left from six weeks to two months. After that it can be washed in the ordinary way.

The Keefer hydraulic claim is near by on the same channel. They have a large ditch and a new flume to carry 3,000 inches of water. They have spent a great deal of money in getting the claim opened, and it is only now partly arranged. They have a bank 80 or 100 ft. high, and the width of the channel to wash out. The mine is expected to be a very profitable one when fully under way.

Around Angels Camp

Times are lively again, and a good many arastras are at work. Some 200 or 300 men are working and prospecting thereabouts. Carlo Bros. have a large ledge of sulphureted ore. They ship it to the mill company at Murphy's. This mill is owned by a Boston company, and was put up last summer. They have large roasting and chlorinating works, and work by what is known as the Blaisdell & Morris process. In the

Vicinity of Murphy's

New mining properties are being opened every week, and times are pretty lively. The presence of the mill has been a great incentive to men to prospect for quartz, for the mill company will buy this ore from the miners. The mill company also owns several good properties itself. Their interests are all confined to quartz. There are good hydraulic mines there formerly worked, but they never had a good water supply. The flume blew down some four years ago, and there has been no water supply since. In the big red hill, where the mines were worked, there are large holders. These fall out, encumber the ground, and have to be blasted out of the way. The mines of

Douglas Flat and Vallejo

Are within a few miles of each other. They are principally gravel. Lack of capital has prevented their being worked to any extent. Mr. Andrews says there are miles of ancient river channel from 130 to 200 ft. deep, that never have been opened, but the gravel of which is supposed to be enormously rich. It is really, he tells us, a good field for capital, one of the best in California. Everywhere the channels have been opened, they have paid well.

The Moffat & Barnes drift claim at Vallejo is paying well, and this is the only mine that is being worked there now. The other mines would pay. They need money, however, to put up machinery and outfit their claims. The mines in the vicinity are all worked by drifting. To get fall to hydraulic would cost more than the miners can afford, though capital could accomplish the object.

In the deep channels, they have generally to slack the gravel; that is, where the gravel is cemented. In these claims, however, they can wash up at any time.

There are several hundred men about Douglas Flat and Vallejo "coyoting" about, but all making a living.

HOISTING WORKS BURNED.—News comes from Eureka that the hoisting works of the Wales Con. mining company have been burned. There was but trifling damage done in the shaft or underground workings. The building was 54x42 in size. About 50 cords of wood also burned. The heavy timbers in the building were expensive, being principally of Oregon pine. The loss is estimated at nearly \$10,000. Superintendent Griffith says that the works will be reconstructed at an early day, the condition of the mine fully warranting it. The night shift had gone below but a short time previous, and had it not been for the tunnel and windlass erected on that level, in all probability all those under ground would have been suffocated. The cause of the fire is supposed to have been purely accidental. It originated in the blacksmith shop, and the forge had been

Information About Mines.

For many years we have been dependent on the efforts of Wells, Fargo & Co.'s express—through John J. Valentine, its manager—for our report of bullion product for the Pacific coast States and Territories. The United States Mining Commissioner—at first J. Ross Browne, and afterwards R. W. Raymond—collected statistics of this character, also, but they usually appeared a year or two after collection, so were not of the value they should have been. It was worthy of note that Mr. Raymond's reports never agreed with Mr. Valentine's, and Mr. Raymond, naturally enough, always argued that his figures were the correct ones. People on this coast, however, based their calculations on Mr. Valentine's figures, for the reason they came out on the first of each year, at a time when we wanted to see them. Moreover, they are published in the newspapers, while the Commissioner's figures were published in his official report, of which perhaps about 50 copies found their way each year to this coast. The rest were carried off by Congressmen and turned into waste paper eventually.

Mr. Valentine, in publishing his tables on the first of each January, had to approximate receipts for the last two or three weeks of each year, in all probability. And, as he always acknowledged, added a certain percentage to the known figures, for an allowance on the bullion carried by individuals and other conveyances than his company. Therefore his figures, while answering all practical purposes, are, to a certain extent, approximations.

The office of U. S. Mining Commissioner was abolished some time since. It never was a successful office, simply because it never received proper support from Congress. The Commissioner was hampered from lack of means. He could not employ a good staff of assistants, and had to depend greatly on voluntary contributions to his report. Congress thought about \$5,000 a year was all that the Government could afford for the mining interests of the country. The Commissioner, therefore, could never do what he no doubt would have liked to do in the way of preparing useful and valuable reports.

After the abolition of the office of Mining Commissioner, his duties were transferred to the Director of the Mint, which official now collects the statistics of bullion production, etc. A call at the Mint, and conversation with Mr. A. W. Lawver, who is attending to the detail of the matter for this coast, developed several facts of interest. When they first went to work they found great difficulty in ascertaining sources of information. That is, they did not know where the mines were or who owned them. It became necessary to take active steps in getting information together to find sources of production. They first sent to Postmasters, superintendents, experts, Registers of Land Offices, etc., in each county, circulars asking them to send the names of superintendents or mine owners. These men were then addressed and asked the value of the products of their mines for the first six months in the year.

The figures resulting from these inquiries will be made public in a few days, as soon as the report of the Director of the Mint comes to hand. They will cover the period of the fiscal year ending June 30, 1880. They have obtained the information not only from mine and mine owners, but also from mills, assay offices, Wells, Fargo & Co., etc. They have a record of the shipments of crude bullion and ore over all the Western railroads for the fiscal year.

Of course the amount produced by each mine is not to be made public, but all the grand totals of counties, districts, States, etc.

These figures will be very accurate, as may be imagined from the way they have been collected, and no pains have been spared to have them complete and full. Mr. H. L. Dodge, the Superintendent of the Mint here, has a certain district in which he collects statistics, and the rest of the territory of the U. S. is divided up among other Mint Superintendents. Mr. A. M. Lawver, who attends to the details here has shown much intelligence and energy in his work, and has really accomplished a great deal in the comparatively short time he has been at work. A very large number of inquiries have had to be made and a great deal of work has been done. On the first of January, circulars will be sent to all superintendents requesting information of the bullion production of their mines from June 30, 1880 to January 1, 1881. A stamped and addressed envelope will be enclosed with the blanks so all that will have to be done is to fill out the blanks. It is to be hoped that all mine owners and Superintendents will comply with the request. The figures are not made public.

KENTUCK ELECTION.—At the annual election of the Kentucky M. Co., on the 24th ult., the following were elected Trustees for the ensuing year: T. L. Lyon, C. C. Stevenson, Wales L. Palmer, D. Bohen and George T. Marye, Jr. The Board subsequently organized by the election of George T. Marye, Jr., President, and T. L. Lyons Vice-President. C. C. Stevenson, of Gold Hill, was appointed Superintendent, A. C. Stuart Secretary, and the Nevada Bank Treasurer. The new management has reduced

Our Coast Ship-Building Interests.

We are provided on this coast with as fine ship-building timber as there is in the world. And it is not only fine but it is abundant and easily accessible. Still our ship-building interests, like those of this nation at large, are by no means what they should be. Our work has been confined principally to coasters, and vessels for the inland and Mexican trade. They have been mainly fore-and-aft vessels, though some square-riggers have also been built. These have not been in the proportion we could have hoped; but what we have built have proven able, fast and strong. Sailing vessels are slowly but gradually disappearing from the seas. Big steamers of four, five, six or eight thousand tons are doing all the work. They carry the same proportion of freight with less men, make quick and sure passages, load and discharge rapidly, turn out their cargoes in good order, and the consequence is that wherever they are put on, the sailing vessel is forced to leave. It is only on the very long-voyage routes that the sailing vessel has any chance of competing; or, in fact, has any chance of doing anything at all. On this coast, as elsewhere, these conditions are felt. At all the numerous coast ports on the California, Oregon and Washington line, and up to British Columbia, where formerly sailing vessels did the trade, the steamers now call. Fine steamers, carrying both freight and passengers, make trips as regularly as clock-work, carrying off material as fast as produced, and force the sailers to discontinue. Our coasting fleet has therefore decreased in numbers. All there is left of them is the lumber and coal trade. There is now talk of steam colliers, which will take even that work from the few employed in it, since more steamers will no doubt follow this one now being fitted up.

Our bay fleet of schooners, formerly numbering into hundreds, and carrying grain down to deep-water vessels, have nearly all disappeared. The railroads have driven them away. Steam-tugs, towing barges which carry a dozen or two schooner loads, do what water work there is. Half a dozen men, with a tug and barges, look out for what, under the schooner system, called for about a hundred men; since the wheat towed by one tug would load twenty or more schooners. A few schooners still run to small landings on the bay shore and up the sloughs, but there is not now one where there was formerly ten. With our coasting and bay trade done by steam the sailing vessels had, of course, to go to the wall. All the new vessels built have been for the inland or Mexican trade, or for lumber-carrying.

The lumber droghers built on the coast are first-class vessels. They are given plenty of shear, and are made to carry enormous deck-loads, some of them carrying two-thirds of the load on deck, only one-third being in the hold. They are loaded down to the deck, the rail and ends only being out of water. Still very few accidents occur from this apparent overloading. A question for our serious consideration is how can we foster our ship-building interests on this coast? How can we advance them? The annual report of the Register of the Treasury states that the total tonnage of the country exhibits a decrease of 101,566 tons. The enrolled tonnage has increased 37,751 tons, while the registered tonnage has decreased 138,723 tons. Referring to ship-building, the Register shows that during the past year the amount of building has been less by 35,620 tons than the preceding year. These figures, of course, refer to the condition of the industry in the nation at large.

The new sailing vessels are all iron ones; the new steamers are all iron ones. They have even begun to build, in New York, several iron passenger steamers for inland waters. The new steamers recently brought to this coast, for coasting trade, by the two companies in that business, are iron. It is plainly forecast that the days of wooden ships are numbered. Steam whaling vessels are found to be superior to the old style of vessels, and several are being built to take the place of old barks. The steamers will drive the sailers from that trade. The iron vessels are found to be better in the long run, all things being considered, than the wooden. Therefore the wooden vessel must disappear.

Our coast ship-building interests, like those of the nation, are languishing, and we can really see, under existing circumstances, no way of building them up beyond their present extent, unless we start in to build iron ships, or, at least, composite ones. It is evident that to compete with other nations on the high seas, the Americans must build iron ships. On the Eastern coast they build a few iron steamers; we say few, as compared with European shipyards. On the Pacific coast we build none, as yet, but we hope to see the day when this industry will be inaugurated among us. Still, it must be confessed if it does not pay to build iron sailing vessels in the East, with cheap iron and coal, it is useless for us to attempt it at present here. We should like to hear from some one having experience in iron shipbuilding, so as to ventilate the subject more fully.

The Battle Mountain Messenger predicts that the Nevada Southern road will be open for travel on the 1st of June, 1881, and says: The building of this road is only a starter of which will be a continuous line of rails from Battle Mountain to the Colorado river, and will be the means of opening up an immense field of good mineral country.

The Coal Cruelty.

We do not profess to know all the ins and outs of the coal business, but it seems plain that those who assume the responsibility of providing for the comfort of the people, as coal importers and coal dealers, have been either cruelly negligent of their duty or else criminally cruel in their business policies. It is stated in behalf of the coal dealers that there is no combination to restrict supplies and advance prices, but that the scarcity came without design and that the high prices are consequently unavoidable. Now, while poor people are shivering and eating cold or half-cooked food; while the little ones are being hunted down by death in the damp houses, and adults are contracting the many diseases which spring from exposure, it is perhaps not worth while to split hairs about the exact cause of the present cruel coal famine. In any way we can look at it the coal dealers are to blame. They can calculate quite accurately the consumption of coal, and it is their duty to the public to mix enough humbug with their greed to take measures to secure a good supply to meet the consumption. Ordinary business sense would order them to do this, and, as coal is abundant at the mines and there has been no general sinking of ships, we do not see that there is any excuse for not having

Attaching Bullion in Transit.

The Reno Gazette tells of a case that will determine a doubtful question, as follows:

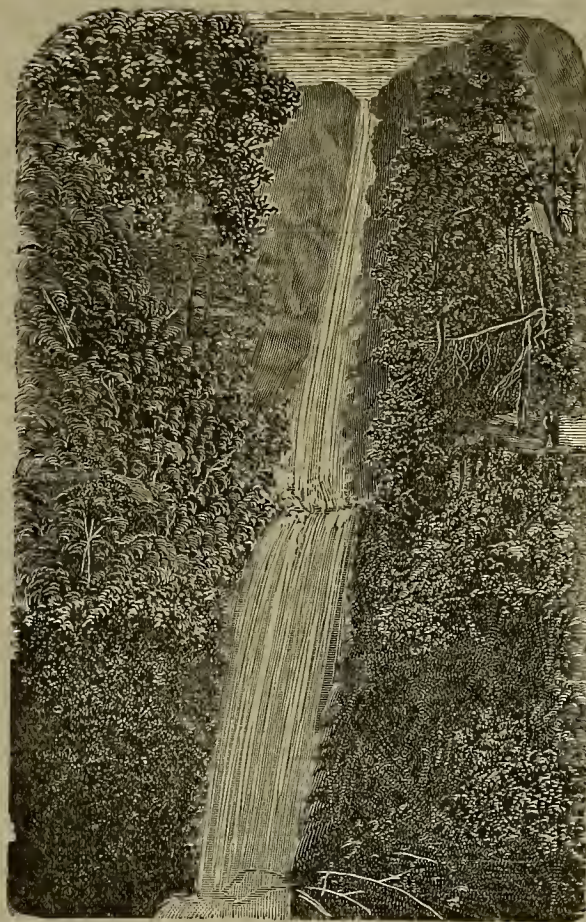
"Have you two sacks of bullion here from the Arizona mill and mining company of Unionville?" asked deputy sheriff L. Chamberlain, as he swung himself into the express car on the west-bound train at the depot here last Saturday night. The messenger knew Chamberlain and tried to convince him that there was no such bullion in the car; but the officer grabbed the way-bill and saw that it mentioned the bullion he was in search of. He then showed a writ of attachment.

"Well," said the messenger, "you can't have it anyhow. You can't take any thing in cars of the express company."

Chamberlain said he could. He found the bags and took them. The bullion was valued at \$350. It was attached by Jerry Schooling. As the railroad and express companies claim that goods in transit are not subject to attachment, there is likely to be some litigation over the seizure to decide the point.

Another Waterfall on the Columbia.

In our issue of November 6th, we gave an engraving of La Tourelle falls on the Columbia river together with some interesting state-



MULTNOMA FALL ON THE COLUMBIA RIVER.

coal enough on hand. Of course we know that ships have been, in demand, and rates high, but there has been no advance in carriage cost commensurate with the almost prohibitory price which coal now commands. Therefore we say that the doubling of the price of a ton of coal is either the result of culpable business negligence, or something worse. If it be the result of preconcerted action among dealers not to bring so much coal here as the people need, then their action is inhuman, and if earthly tribunals do not meet such wrongs, there is an hereafter, where such outrages upon the comfort, strength, and even the life of their fellow beings will be suitably handled. We are loth to believe that the present cruel condition in coal is the result of design. It is almost too painful to think of; but whether the result of neglect or intention, it is a wrong beyond words to describe, and which those dealing in coal should never allow to occur again.

The third trial of the Idaho G. & S. M. Co. case began Monday in the Superior Court at Nevada City. The plaintiff sues the company for \$50,000 damages, on the grounds that he lost one of his legs and sustained other injuries, owing to the use of dangerous blasting powder in the mine.

AFTER two years more coquetting with various places for bonus inducements, the Sweepstakes Plow Co. have determined to remove from San Leandro to Benicia, the citizens of that town having purchased and donated to them the buildings, wharves and other property formerly used by the Pacific Mail Steamship Co.

moats concerning this mighty water course of the North. Along the same river there are many cascades, and another of them is shown on this page. It is known as Multnomah falls. The engraving is from Mr. Conklin's forthcoming book, "Picturesque Northwest," to which we have frequently alluded. The "Multnomah" falls are about 700 feet high, and divided into two sections; the upper being 500 and the lower 200 feet. The first section falls into a pool, carved from a rock, about 20 feet in diameter, filled with the finest mountain trout, and festooned with the finest maidenhair and other delicate ferns. At this pool, hemmed in by the botanists' choicest studies, from fern to mountain timbers, and protected and ornamented by rocks and boulders, a general formation of the whole producing a concave grotto in the side of the mountain, over and down which "Multnomah" chooses her leap, is a model picnic ground, where one can be scared into superstition by the echo of his own voice.

RAILROAD COMMISSION AND STEAMERS.—A friendly suit will be brought by the Railroad Commissioners of this State against the Pacific Coast steamers, to determine the power of the Commissioners to regulate rates of carriers whose lines run beyond the limits of the State. The Commissioners claim that they have that right as to freight carried from one part of the State to another, and over freight rates earned by goods in transit through the State, no matter what may be their ultimate destination.

The receipts for tolls on the canals in New York this year are \$600,000 greater than the last.

Neighborhood Improvement Associations.

The dwellers in the southeast quarter of the town of Berkely, Alameda county, have organized an "association for the promotion of neighborhood improvements." Two enthusiastic meetings have been held, simple by-laws for the guidance of the organization have been adopted and officers have been chosen.

We have upon former occasions alluded to the work of village and neighborhood improvement societies at the East, and we are glad to know that similar effort is to be put forth in this State. We trust that it will attract the attention of villagers everywhere throughout the State, and that our host of beautifully located and envied towns and hamlets will be brought into truer harmony with their surroundings by the growth of trees, the excellence of their roads and the general nestness of their highways and door-yards. In order to remind our readers of some of the directions in which village improvement may be advanced, we shall mention some of the results which the Berkeley Association aims to secure by co-operative effort. The objects of the association are to encourage and promote the improvement and ornamentation of the streets, stations and public places of the locality, by planting and cultivating shade and ornamental trees; establishing and maintaining walks; grading and draining roadways; clearing the streets, avenues and sidewalks of unsightly weeds, refuse matter and rubbish; promoting the introduction of water and its utilization for sprinkling the streets; the consideration and promotion of such a system of sewerage as may be best adapted for the sanitary condition of the town; encouraging system, order and tidiness, and generally to do such other acts as may tend to beautify and improve the neighborhood as a place of residence.

Taste and comfort alike demand that these natural advantages should be reinforced by individual effort and co-operation. This it is the design of the association to promote. A vast deal has been done wherever improvement societies have been organized, in the way of stimulating citizens to adorn their private grounds, or, at least, to keep their grounds and fences in good order, removing weeds and rubbish from the sidewalks, etc. "What most detracts from the good appearance of any village is the slovenly look which comes from badly hung gates, crooked fences, absent pickets, and general shiftlessness about private places, and it is by encouraging citizens to take a pride in attention to these details that the association will do its best work. This result may be accomplished almost entirely without the expenditure of money. It is in attention to little things, and in securing the co-operation of private owners—a co-operation which will call for an inappreciable amount of labor—that the most telling work of the society is to be done."

The first work of the Berkeley Association will be in the direction of tree planting—shade and ornamental. As a preliminary movement a committee of experienced men has been appointed to select a list of trees (chiefly deciduous), adapted to the soil and locality, and to ascertain the terms upon which they can be delivered in quantities to the association. Through it they can be furnished to private owners, or planted by contract, under the auspices of the association. It is desired that along every street and avenue (those projected as well as those opened for use), shall be planted shade trees during the present winter. If practicable, clumps of evergreen trees, for wind breaks, should be planted in needed places, under professional supervision. It is obvious that the effect of these, in a very few years, would not only add largely to the beauty of the landscape, but modify the effects of the occasional high winds. Other work will be evolved as the association grows in experience. It is proposed that the revenue of the association shall be derived from a membership fee of \$1 per annum from each person over the age of 16 years; from contributions of non-residents, in consideration of the planting and care of trees, fences, grounds, etc.; from donations and life membership fees from public spirited individuals.

We trust, as we have said before, the pioneer effort at Berkeley will be emulated in all parts of the State. In the hope that there may be such a disposition to organize we will soon give the simple articles of association, and by-laws adopted by the Berkeley society, in case they may be suggestive to those who desire to begin similar work. The main point in organizing village improvement societies is to enlist the active support of every resident in the community, and especially the active co-operation of the ladies. Colonel Waring, an enthusiast on the subject, in a little book on Village Improvement Associations, from which we have already quoted, says: "It requires the sort of systematic attention to details, especially in the constantly recurring duty of 'cleaning up' that grows more naturally out of the habit of good housekeeping than out of any occupation to which men are accustomed."

A SPECIAL train taking Col. Geo. E. Gray, chief engineer of the Southern Pacific railroad, and a party of other C. P. officers, to San Francisco, met with a serious accident fifteen miles east of Yuma, Monday. The engine jumped the track and was ditched, the baggage-car being thrown across the rails. The only person injured was Bruce, the engineer, who had a leg broken and sustained other injuries.

Improvement in Mine Cars.

An ingenious arrangement for a constant automatic lubrication, and also for giving more freedom of action to the wheels of colliery tubs, etc., has just been devised by Mr. James Reilly, of the Globe Mahogany Chair Works, Pomona Gardens, Manchester. Colliery tubs as now generally constructed simply rest upon open bearings, which have to be constantly re-oiled, and being exposed to the dirt and dust quickly become clogged, which necessarily not only interferes with the free action of the wheels, but greatly adds to the wear and tear upon the bearings. Mr. Reilly's invention does away with all these disadvantages and may be briefly described as follows: In the first place, the wheels run loose upon the shaft or axle-tree, instead of being fixed as at present, and the boss of the wheel is so constructed as to form an oil box containing a sufficient quantity of oil, which is supplied from the outside, to continually lubricate the wheels for months without replacing. The outside of the boss, which has a solid end, is recessed beyond the end of the bearing to the extent of three-quarters of an inch, to contain oil, whilst the inner portion of the boss is bored through on the outer rim, and these bores, which also contain oil, communicate with a groove in the center of the boss, which passes the oil on to the bearings. These apertures to the oil box from the inside portion of the boss are tightly closed up by means of turned collars bolted over the holes, and as the outer portion of the boss, as already stated, is solid, it will be seen that the oil box is perfectly closed up from dirt and dust, in fact nothing can get near it, and it is left free to act constantly upon the bearings through the flange in the center of the boss. A further advantage is secured by the wheels being fitted loose on the axle-tree, and allowed free action inside the boss. The tub, by the independent play of each wheel thus secured, can be turned readily in any direction, and round the sharpest curve without the assistance of a turn-table; indeed, such is the freedom of motion that a pair of wheels on a level surface will describe without difficulty a complete circle or even a figure eight. Mr. Reilly also intends attaching to his patent wheels a counting indicator, which will record every time the tub has been tipped, and thus afford an effective check against the weighman on the pit bank.

PUBLIC LAND DECISIONS.—A Washington dispatch says: The Secretary of the Interior rendered a decision of wide application and large importance, in the matter of the adjustment of the California School Land Grant, as regards indemnity selections certified prior to March 1st, 1877. In this decision Secretary Schurz holds that only defective or invalid selections, made in lieu of actual losses or deficiencies, and selections made in lieu of 16th or 36th sections, alleged by the State at the time of selection, to be lost in Mexican grants, but which since March 1st, 1877, have been, or may hereafter be, found upon the final surveys of such grants, or by approved public surveys, not to be so lost to the State, are confirmed by the Act of March 1st, 1877, commonly known in California as the Booth bill; that no more than one section (the first one) is confirmed in lieu of the designated loss or deficiency; that no selection is confirmed which was made in lieu of a 16th or 36th section, shown by survey at the time of selection to be in place or in lieu of a 16th or 36th section, which by final survey of a Mexican grant or approved public surveys, was ascertained prior to March, 1847, not to be lost to the State, the State in such cases taking the 16th or 36th section, and the United States the selected land, to be disposed of to a purchaser of the State, or in case no State purchaser claims it, then to be disposed of as other public lands. The Secretary also holds that in no case can the State take the 16th or 36th sections, and the lands selected in lieu thereof; hence, that unless 16th or 36th sections, in lieu of which other lands have been illegally selected and certified, revert to the United States under said Act (which cannot be the case where the 16th and 36th sections were ascertained to be in place by surveys returned prior to March 1st, 1877), the selections are not confirmed, and the selected lands are held for disposal under the provisions to the second section of the act, as are all other selected lands, the selection of which shall be found to fail, and not to be confirmed by said act.

THEY HAVE STRUCK IT.—There has always been very rich float rock found about two miles west of Carlisle and one mile west of Old Man Mountain in Meadow Lake mining district. This rock has paid by assay over \$100 per ton as it was picked up on the surface. The ledge from which this float rock came has never been discovered, although it has been searched for by many parties. Recently, James Gould, the man who introduced the process of working Meadow Lake ores, and Geo. W. Giffen, commenced a search for the ledge, and after about two month's work, they struck a formation which they think is the right one. It is about five ft. between walls, is well defined, and the vein matter is composed of clay, quartz and porphyry, and being in the right locality, they firmly believe it is what they have been searching for. Both gentlemen being good democrats, came into town on Sunday to remain till after election, when they will return and resume work on their find.—*Truckee*

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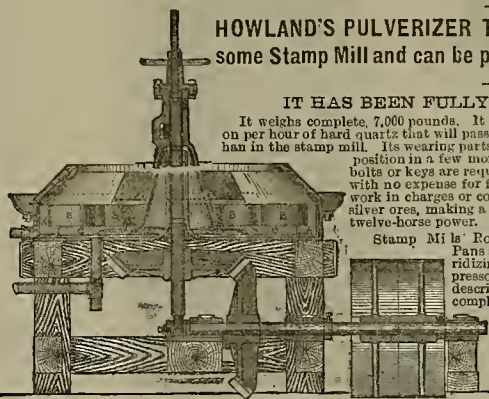
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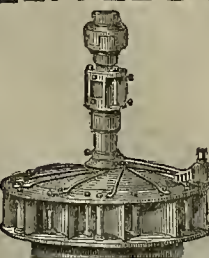
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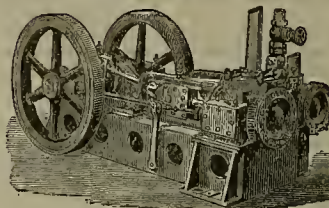
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING NOVEMBER 18TH, 1880.

234,460.—BOOK HOLDER—W. B. Daugherty, Carson, Nev.
234,462.—CONDENSER—T. W. Dresser, San Jose, Cal.
234,576.—HARROW—W. H. Hulings, Menlo Park, Cal.
234,591.—MILL COUPLING—L. B. Lathrop, Hollister, Cal.
9,464.—VEHICLE SEAT—Re-issue—F. Oppenheim, S. F.
234,425.—ROOFING COMPOSITION—C. F. Pearson, Portland, Oregon.
234,509.—HAY PRESS—B. M. Watts, Los Angeles, Cal.
Note.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions* rendered upon patent cases in litigation, for the benefit of our readers:

DECISIONS OF THE U. S. COURTS.

Holly vs. Vergennes Machine Co.
U. S. Circuit Court, District of Vermont. Decided October term, 1880. Wheeler, J.

1. The meaning of a claim in a patent is to be derived from the specification.
2. Two devices are substantially the same in the sense of the law of patents, when they perform the same functions in substantially the same way to accomplish the same result, and except when form is the essence of the invention, it should not be regarded in the question of infringement.
3. In determining the matter of infringement, attention should be paid to such portions as really do the work, so as not to give undue importance to parts used only as a convenient mode of construction.
4. The patentee is entitled to the exclusive use of the whole of this patented invention, and if it is a combination of numerous parts, including in it other new and useful combinations of some of the parts, he seems to be entitled to the exclusive use of these lesser combinations, as well as the exclusive use of the whole.

The National Car Brake Shoe Co. vs. The Lake Shore and Michigan Southern R. R. Co., and Same vs. Illinois Cen. R. R. Co.
U. S. Circuit Court, Northern District of Illinois. Decided October 26, 1880. Drummond, J.:

1. Effect must be given to the whole of the description contained in the specification and drawings of a patent. Hence, if it can be ascertained that a patentee intended to divide his invention into two parts, and to describe and claim them as separate improvements, the patent must be construed according to this intention, so as to give full effect to each part of the invention.
2. When a patent claims, first, a combination of two parts, so arranged, that one can have a "lateral rocking motion" on the other, and, secondly, a combination of the same parts with two additional elements, "the whole being constructed and arranged substantially as specified," but not in terms referring to the rocking motion, and second claim is infringed by the use of its combination of mechanism, although the arrangement is such as not to permit any rocking motion.

* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

A Trip Down the Coast.

EDITORS PRESS:—Never did the Pacific Coast Steamship Company carry a hungrier set of passengers than that which left San Francisco on the *Oriaba* on the 14th inst. The sun shone brightly and set grandly; the sea was calm—for much of the distance as calm as though oil had been poured upon its surface, and all the passengers, children included, took their meals with a regularity which must have distressed the waiters.

Besides the usual assortment of San Franciscans on a cruise southward, the company included two families from East of the Rocky Mountains, both bound for San Diego, where they intend to locate, and also one or two unencumbered gentlemen *en route* for the same place. For in the East it is firmly believed that this time the railroad is coming to San Diego, and no mistake. On the faith of promises made by the new competitor for Californian trade these families have left their homes, to seek in the balmy climate of southern California health and a livelihood. Other families have preceded them; others still are coming.

These new-comers do not doubt, like the average San Franciscan, the possibility of a prosperous future for San Diego; and, after conversations held with them and others, the writer is convinced that this time it is no flash in the pan, no momentary *furor*, but a real railway which will be carried through, and which will be a formidable rival to the Central and Southern Pacific. But the people of San Francisco need not fear that the prosperity of San Diego will interfere with that of their sand-hill city. Even if the harbor of San Diego, with its narrow entrance, could compare with the grand bay of San Francisco in accommodation for vessels, the railway to it will, after all, be only a branch, the main line running up to and terminating at the present commercial capital. This, at any rate, is the intention and the route marked upon the maps shows the line as passing Santa Barbara—whereat the good people of this place are exceedingly jubilant, and prophesy unto themselves all manner of good things. At sunrise on the 15th we were at the wharf.

At Port Harford,

Where we disembarked, a considerable proportion, both of passengers and freight. There had been a landslide at the entrance of the tunnel

nel through which the railway from San Luis Obispo, which is about nine miles distant, finds its way to the sea shore, so that those bound for that place had to walk some distance. The tide was up, the cliffs were high, the general aspect of this shore, like that of the hills facing the northern side of the Golden Gate, was bare and brown, but I was assured there was much good country back of these hills, and that the mesa or terrace to the south bore potatoes and fed sheep. At Port Harford the steamer's head was turned northwest, lying almost parallel with the shore, which here curves so as to afford protection against all storms coming from the north or northwest. The automatic buoy scarcely made a sound as we passed it, so nearly waveless was the ocean. Between Port Harford and Point Sal most of the coast is a broad terrace, containing much good farming land, but fronted along much of its length by extensive sand-dunes. We were told that large quantities of grain were awaiting shipment at Point Sal, and from the deck could trace by the clouds of dust they raised on their passage, the progress of the wagons that were bringing still more down the rough mountain road. The wharf at this point was destroyed in the past winter, and has just been rebuilt. Beyond Point Sal is the Lompoc country, which is accommodated with a good wharf. We could see the wharf, but not the beams which a waggish native of the locality told us to look for. Now we approach

Point Concepcion.

The Cape Horn of California, the boundary below which only a very small proportion of the northern marine fauna passes, and north of which only a remnant of the southern fauna ventures as far as Monterey bay. Point Concepcion runs out into the sea farther than most of the capes of Alta California, and is backed by an extensive mesa. At its extremity it rises into a rugged and precipitous, but not very lofty cliff, on the summit of which the lighthouse is perched. This point, as is remarked by Prof. Davidson, is one of the most striking examples of the terrace formation to be found upon the coast, and at the same time one which most bears out the theory of the glacial origin of those terraces. It seems as though the ice sheet, as it passed along the coast, grinding down the lower foothills, wherever they interfered with its progress, to a level surface, irrespective of their stratification, was at this far-projecting point too narrow to reach to the extremity, which was thus left above the level of the country behind it.

Immediately after turning the point, we reached the bed of kelp which continues southward along the coast, its inner edge near low-water mark, its outer in 10 fathoms or thereabouts. Into this kelp, and as close as we could in shore, we steamed, in order to put ashore the well-known extensive land and cattle owner, Patrick Murphy. Looking over the side of the vessel, as we drifted with the tide, we could see the long streamers of sea weed floating for some 60 or 80 ft. from the point where they first came near enough to the surface to be visible. Eastward our course lay now, and soon it became northward as we approached

Santa Barbara.

I shall never forget the beauty of the scene. In the bright moonlight, nestled among trees at the foot of the Santa Inez mountains, with lower hills to the right and left, Santa Barbara looked indeed a place at which one would be content to live. Nor is the spot less charming in the daytime, though the Santa Inez mountains show less near, and the intervening foothills come into view. The trim gardens, neat, and often handsome residences, and clean streets, joined to its position in a valley between two ranges of low hills, all combine to give it an aspect more pleasant than that of any of the more northern towns of the State, except, perhaps, Santa Cruz and San Rafael. Yet a nearer acquaintance with the flora of the hills and valleys is disappointing to one accustomed to the wooded country around Mt. Tamalpais, although it might please an Oaklander. The only tree upon the lower hills is the live oak (*Quercus agrifolia*), and the valleys add only the eucalyptus, willow, and a few ceanothus bushes. No madroña, with its glossy leaves and smooth, velvety bark; no hazy tree (except in the gulches) towering above the oaks; no chestnut oak, no ash, no maple, nor, at least in all the lowlands from Santa Barbara to Rincon, any kind of pine, spruce, fir, or redwood. The black and red oaks grow in more elevated localities, but even there there is none of that variety of foliage which gives so great a charm to the wooded regions of Marin county.

But man has done, in every sheltered spot, what nature failed to do, and his gardens and plantations give a semi-tropical aspect to the more cultivated portions of the country.

Groves of Oranges and Olives.

Hedges of limes, date palms, fan palms and bananas, fig trees and guavas, and fields of pampas grass grow side by side with the more familiar pumpkin and apple. The date palm, to my mind not pleasing when old, is a very graceful object when young; its long, feathery leaves rising from near the ground, and arching downward at their tips. The guava is not planted, like Mark Twain's pumpkin, for a shade tree, but for use. The fruit is preserved, and guava jelly is made. There is a fruit cannery on State street, and I am told it is kept busy.

The olive and the orange are planted extensively, and are at present in a flourishing condition, but their fruitfulness is menaced by the scale bug or coccus, which is becoming abundant. I was shown two encies in Mr. Bingham's plan-

tation at Montecito; one living upon both olive and orange, the other apparently on the orange only. This first is black, rather large, about a sixth of an inch in length, and lives principally upon the branches and in the axils of leaves and twigs. The other is much smaller, and lives upon the upper side of leaves, especially affecting the midrib. All the examples I saw of the black kind were old and dried scales, but the other kind were in various stages of growth, and in great abundance upon the trees infested by them. Many of the leaves on the oranges where this coccus was plentiful were covered on their upper surfaces with a black substance, looking much like a fungoid growth; which, however, it could scarcely be, as it was readily brushed off, leaving the surface of the leaf apparently uninjured. The idea that it had any relation to the coccus so often found with it, was weakened by the occurrence of the insect on leaves whose upper surface showed, to the naked eye, no traces of the black substance.

In and around Santa Barbara, as in and around San Francisco, and everywhere else in California where he makes his home, modern man has planted the blue gum and the pepper, the latter of which thrives vastly here, increasing to a tree some 50 ft. in height, and the equal of the native oaks and sycamores.

At this Season

One of the most conspicuous features in the fields is the quantity of pumpkins that lie ripening in the sun. Many of these are of great size. Mr. Shepherd had one that weighed 220 lbs., and examples as big as a beer keg are common. Flax is fast becoming a staple crop in this neighborhood, but is now all harvested, so that all that is visible of it is the straw, much of which is thrown into the roads in sandy places to make good. One man near Santa Barbara had some 900 sacks of flax seed. But the crop that predominates all along the coast from Montecito to Carpinteria and Rincon is the Lima bean. As a boy remarked, the people are crazy for it. Now is the bean harvest, and the processes of carrying, threshing and winnowing are being actively carried on, the two latter out of doors, as well as the first. The usual method of threshing is very primitive, being nothing more than that so often hinted at in scripture. If, in the phrase "the ox that treadeth out the corn," horse was substituted for ox, it would apply to this neighborhood. Steam threshing, they say, don't pay, so they drive a band of horses and colts into a corral, previously strewn with a layer of beans, and whip the animals around, varying the operation occasionally by driving round with a wagon and span of horses. A large proportion of the crop must necessarily be lost by such a method as this, yet the crop is a profitable one in a season like the present.

Last year was a bad one, but this year has brought amends in full crops of everything, from flax, beans and pumpkins to figs and pampas grass, which last is grown in large quantities, the long, white plumes finding a ready market in the Eastern States. Other fruits grown here in considerable quantities, are the almond and the walnut. The latter succeeds well as a fruit-bearer as far south as Los Angeles, but even at Santa Barbara shows its disgust at the warmth of the climate by remaining a large hush, instead of growing into a splendid tree, as it does in England.

It must not be supposed that figs, palms, oranges, and such like semi-tropical fruits will grow anywhere, even in this mild climate. They need shelter and water, two things only obtainable in certain favorable situations throughout all southern California. Most of the best places here are already taken, yet there is still room and new people are still planting. One man is going to plant out 5,000 oranges this year; another will plant 25 acres with the same fruit.

The country available either for agriculture or pasture around Santa Barbara is of limited extent. Successive ranges of low hills, coming down from the mountains to the sea, part the coast country into a series of sheltered valleys. Santa Barbara occupies one of these, and thence eastward succeed Montecito and Carpinteria, the further extremity of which is known as Rincon, a word which is simply Spanish for a corner or internal angle. Westward, toward Point Concepcion, the structure of the country is similar. A noticeable feature of many of the spurs given out by the mountains between Santa Barbara and Point Concepcion is their termination in a hill higher than the range behind it. The carving of these ridges has been done by ice; we can imagine how the ice sheet, descending from the heights above, swept over the upper portions of the foothills, but failed to overwhelm the extremities of the spurs, leaving them as monuments to be rounded off by the rain and the weather. Back of all these valleys stretches a vast waste of mountain country, the interlacement of the Coast and Sierra ranges.

Santa Barbara is dull just now. The continuance of fine weather retains in San Francisco many of those people in delicate health, but with fall pockets, who are accustomed to make this place their winter home. One wonders what the people find to do, but the same air of dullness pervades all watering-places out of season. Let us hope the Barbareños will have a good one when it comes.

W. N. LOCKINGTON.

Santa Barbara, Nov. 20, 1880.

THE Homestake dividend of \$30,000 regular and \$30,000 extra was paid in New York last week.

News in Brief.

THE typhoid fever is epidemic in Grass Valley.

THE total four per cent. bonds registered is \$528,100,950.

THE Montensgrins are to occupy Dulcigno with 40,000 men.

THERE are 20,000 cords of wood piled in the outskirts of Bodie.

THE recent severe weather damaged the cotton crop 500,000 bales.

THE skating is now excellent in many places along the Carson river.

IMPORTANT discoveries in gold placer diggings are reported from Alaska.

GROUND has been broken for the new railroad shops at West Oakland.

THE ship building of the country declined 101,566 tons during the past year.

THE outbreak of a horrible war with fearful huthery is reported at New Calabaria.

THE total vote in the Presidential election was 9,192,595. Garfield's plurality, 3,401.

DE LESSEPS says that everything is ready to commence work on the Panama canal.

THE ministers of St. Louis have decided to bring suits for a violation of the Sunday law.

WORK on the Oregon railroad is vigorously progressing, over 200 graders being employed.

J. W. MORSE has been appointed General Passenger Agent of the Union Pacific Railroad.

IN the fighting at Dulcigno, the Turks lost 300 killed and wounded, and the Albanians 400.

HANLON and LAYCOCK, the oarsmen, have been matched for a race on the Thames, January 17th.

KHYBER PASS, the sole remaining fruit of the British campaign in northern Afghanistan, is about to be evacuated.

FRANCIS HOTCHKISS died suddenly at New Haven, Conn., Monday, and his wife, on hearing the fact, fell dead.

THE control of the Missouri, Kansas and Texas Railway Co. is to pass into the hands of the Missouri Pacific Co.

GEORGE W. WILLIAMS, a negro member of the Ohio Legislature, is organizing a gigantic exodus of blacks to New Mexico.

THE President has issued a proclamation this week, declaring that Chinese vessels are not subject to any discriminating duties.

THE chief of the geological survey in western New Mexico reports the discovery of a prehistoric city 40 miles from Santa Fe.

THE Secretary of the Navy has approved the course of Commissioner Hughes, relative to the captain of the British steamship Sandrigham.

THE volcano of Mauna Loa, on the island of Hawaii, is in active eruption again. Rivers of lava 30 to 50 miles long are flowing down its sides.

THE steamer *Simcoe* foundered in Lake Michigan on November 24th. The captain and 11 of the crew perished. Five succeeded in reaching land.

DESPITE the energetic remonstrance of the representatives of European powers and of the United States, the persecution of the Jews continues in Morocco.

THE Ute Commissioners have gone to Loe Pine to pay the Uncompahgre Utes \$25,000, being their portion of the \$75,000 paid to the Utes under the treaty.

ON the 24th, a party of miners going from Georgetown, Colorado, to the North Park, were precipitated in an immense snow drift, and two of them were killed.

THERE is now about \$85,000,000 in gold bullion in the United States Treasury, of which it has been decided to coin monthly \$10,000,000 of the denomination of \$5 and \$10.

POURPARLERS are passing between the United States and the French and German Governments for exchanging opinions relative to the employment of the existing silver coins.

GEN. WALKER, Superintendent of the Census, characterizes as entirely erroneous, the recently published statement that the money for the census of Indians has given out and that the work is a failure.

THE track of the Southern Pacific railroad is now laid 18 miles east of the Rio Mimbras. Track-laying has moved slowly the past few days, owing to the scarcity of rails, but a supply has gone forward.

THE Bessemer Steel Works, the Albany and Rensselaer Spike Mill and Burden's Water Mill of Troy, N. Y., shut down last week on account of low water; 1,000 men are thrown out of employment.

ROBERT, son of President Lincoln, received the most votes on the electoral ticket in Illinois.

THE Union Pacific Railroad Company has reduced the passage rates from Omaha to Ogden from 7½ cents per mile to 6.

A FIRE occurred at West Point Sunday night, which destroyed the extensive wharves and sheds of the Richmond, York River and Chesapeake Railroad Co. and the company's steamer *Shirley*; also the telegraph and freight offices and all freight on the wharves, including 2,600 bales of cotton. The loss is estimated at \$350,000. Insured.

TELEGRAMS from Berlin inform the State Department that the cases of American naturalized citizens, who have been arrested in Alsace and Lorraine on charges of owing military service, have been decided in accordance with the claims of the government. The release of Weil has been already reported, and now it is announced in his case, as well as in the previous one of Getres, that all fines and penalties imposed by the German Government have been remitted.

Various Causes—

Advancing years, care, sickness, disappointment, and hereditary predisposition—all operate to turn the hair gray, and either of them incline it to shed prematurely. **AYER'S HAIR VIGOR** will restore faded or gray, light or red hair to a rich brown or deep black, as may be desired. It softens and cleanses the scalp, giving it a healthy action. It removes and cures dandruff and blemishes. By its use falling hair is checked, and a new growth will be produced in all cases where the follicles are not destroyed or the glands decayed. Its effects are beautifully shown on harsh, weak, or sickly hair, on which a few applications will produce the gloss and freshness of youth. Harmless and sure in its operation, it is incomparable as a dressing, and is especially valued for the soft luster and richness of tone it imparts. It contains neither oil nor dye, and will not soil or color white cambric; yet it lasts long on the hair, and keeps it fresh and vigorous.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & Co.'s MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

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DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, DECEMBER 1, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Twenty-two (22) of Seventy-five (75) Cents per share, was declared payable on Monday, December Thirteenth (13), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York.

WM. WILLIS, Secy.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

Alpha Hydraulic Gravel Mining Company.—Principal place of business, San Francisco, Cal.

Location of works, Alpha Hill, Nevada County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the Nineteenth (19) day of November, 1880, an assessment, (No. 2) of Twenty (20) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. gold and silver coin, to the Secretary, at the office of said company.
Any stock upon which this assessment shall remain unpaid on the Twenty-fourth (24) day of December, 1880, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
JAMES IRELAND, Secy.
Office, No. 215 Sansome Street, San Francisco.

Land Purchasers Association.—Location of place of business, San Francisco, California.
Notice is hereby given that at a meeting of the Directors, held on the Ninth (9) day of November, 1880, an assessment of Five Dollars (\$5.00) per share (being a part of the 4th installment on the subscription to the stock), was levied upon the capital stock of this Association, payable immediately to the Secretary, at 315 Montgomery Street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid, on Friday, the Tenth (10) day of December, 1880, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
C. S. WRIGHT, Secy.
N. B.—This assessment is to pay the taxes on the property of the Association for the current year.

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(WHOLESALE.)

WEDNESDAY M., Dec. 1, 1880.

IRON.—		
American Pig, soft, ton.....	32 00	@ 27 00
Scotch Pig, ton.....	26 00	@ 23 00
American White Pig, ton.....	—	@ —
Oregon Pig, ton.....	—	@ —
English Cast, B.....	15 00	@ 18 00
Black Diamond, ordinary sizes.....	13 00	@ 15 00
Drill.....	9 00	@ 10 00
Flat Bar.....	—	@ 16 00
Plow Steel.....	9 00	@ 10 00
COPPER.—		
Ingot.....	—	@ 52 00
Sheet.....	—	@ 50 00
Sheathing, Tinned 14x48.....	—	@ 42 00
Nails.....	—	@ 42 00
Bolts.....	35 00	@ 42 00
Old.....	—	@ 18 00
Bar.....	—	@ 22 00
Precipitate, 100 lbs.....	15 00	@ 15 00
LEAD.—		
Pig.....	4 00	@ 5 00
Bar.....	—	@ 6 00
Pipe.....	—	@ 8 00
Pipe, Soft.....	—	@ 8 00
Shot, Discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Buck.....	—	@ 2 50
Chilled.....	—	@ 2 50
TIN PLATES.—		
10x14 I C Charcoal.....	—	@ 10 50
10x14 I C Coke.....	10 00	@ 10 00
Banca Tin.....	—	@ 25 00
Australian.....	—	@ 20 00
I. C. Charcoal, Roofing 14x20.....	—	@ 21 00
20x28.....	20 00	@ 21 00
ZINC.—		
By the Case.....	—	@ 10 00
Zinc Sheet 7x3 ft. 7 to 10 lb, less than cast.....	10 00	@ 11 00
NAILS.—		
Assorted sizes.....	4 00	@ 4 75

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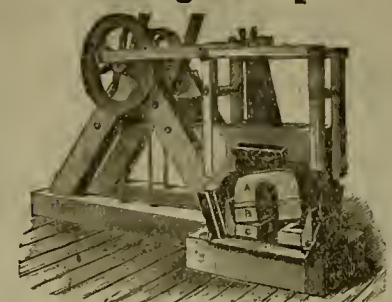
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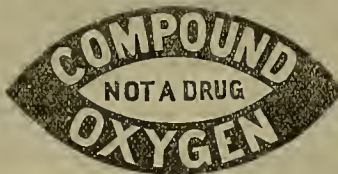
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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

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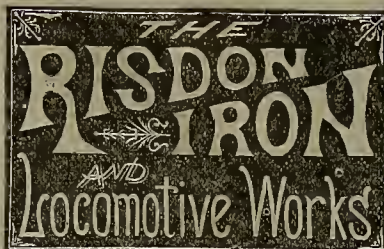
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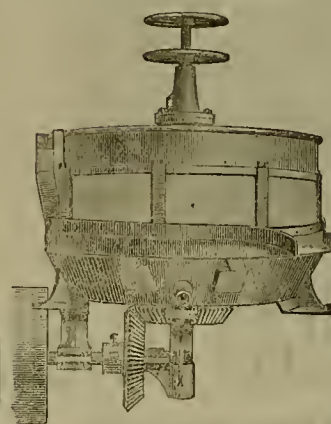
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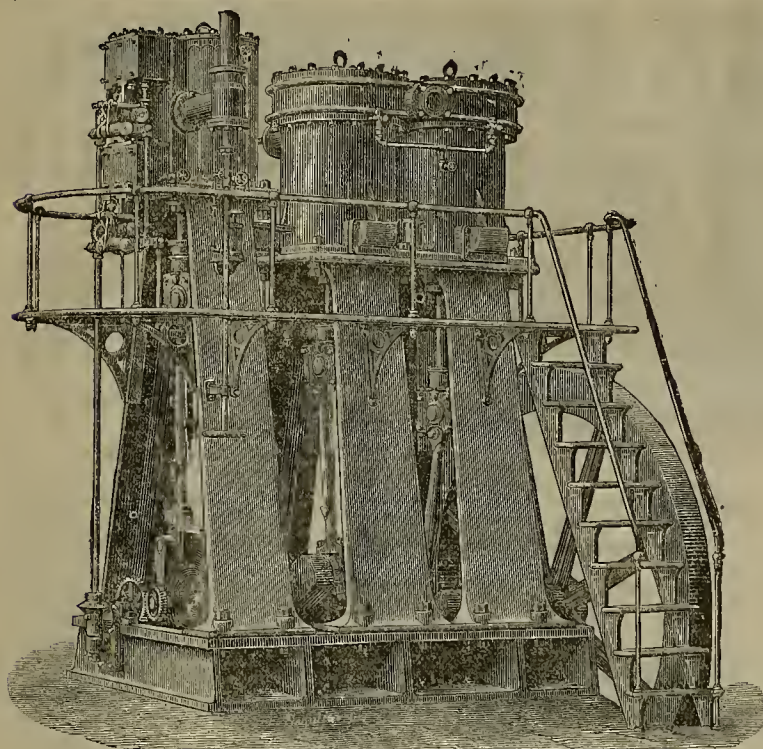
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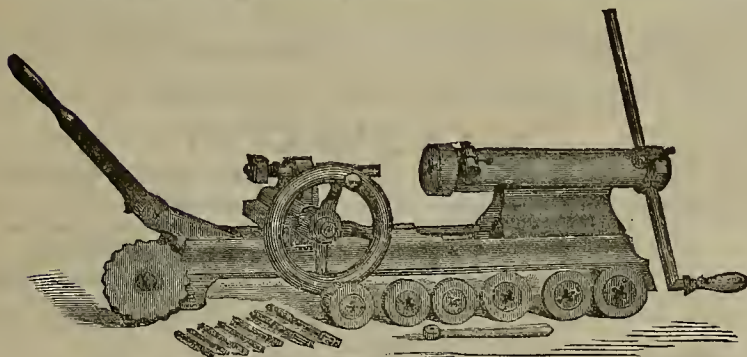
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BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, DECEMBER 11, 1880.

VOLUME XLI
Number 24.

Long Roasting Furnaces.

The engravings on this page represent a vertical section and ground plan of what is known as a long roasting furnace. Mr. Kustel, in his "Roasting of Gold and Silver Ores," says this kind of furnace gives great satisfaction, as there is not only a great saving of fuel effected, but also a greater quantity of ore can be roasted than with a single furnace. It is a modification of the double furnaces, and seems to be more convenient for the roasters. There are two men employed at a time, there being one ton and a half to two tons in the furnace. The hearths are either arranged horizontally, as the drawings show, or only the first one is level, the other two are inclined; this facilitates the shifting of the ore. Each hearth is 10 ft. long and 12 ft. wide. After the first hearth there is a step of four or six inches, partly to divide the first from the others, but principally to effect a better mixing of the ore. The ore is fed on the last hearth, through the sheet iron funnel, spread equally on the hearth, and, according to its dampness or the quantity of sulphurets contained, stirred more or less from one and a half to two hours. As it is not only inconvenient, but impossible, to have a good stirring effected at a distance of 12 ft., which requires long and heavy tools, there are for this reason working doors on both sides of the furnaces. The roaster uses hoes or rakes eight ft. long, and made partly of gas pipe, which are light and handy. The working doors are 30 inches wide. They must all be kept closed except when the ore is being raked, and then it is very proper to have half of the door closed (with a piece of sheet iron). Sufficient air comes in at the working door of the first hearth.

After one and a half to two hours the ore is removed to the middle hearth and spread equally over the whole surface. A new charge is introduced instead of the former. There is a higher heat on the middle hearth than on the last one. The treatment of the ore is here the same as before, being raked from time to time. After a lapse of one and a half to two hours the ore is moved again to the first hearth, in the same manner as before. The ore is now exposed to a light red heat, by which the chlorination or oxidation must be finished in the same time as on the other hearth. It is necessary to change here the ore from the bridge toward the flue, and reverse once during the roasting. When the operation is finished, the roasted ore is drawn into iron cars below the furnace, through the opening in the floor. When all the ore has been removed, the charge on the second hearth is transferred to the first, from the third to the second, and from the funnel to the third hearth, and the process continued as before, so that a thousand lbs. are drawn out every one and a half to two hours.

The bridge is 14 inches high. For the purpose of admitting air or steam, a canal can be made in it. The fire-place is 15 inches wide and 8 to 9 ft. long, and 15 inches below the top of the bridge. The ash pit is made according to what seems more convenient. A deep ash pit is more favorable for the preservation of the grates, as they are less heated. Each door is provided with an iron roller. A furnace of a similar description was in operation in La Dura (Mexico), roasting refractory silver ores for the chlorination process.

A furnace 60 ft. in length, with 6 hearths, as built by Mr. Graff at the San Marcial, had the advantage of being capable of roasting from 8 to 12 tons of ore in 24 hours, discharging every hour from 800 to 1,000 lbs., according to the

charge. In case ore is subjected to roasting which has not enough sulphur to create the required heat in burning, an additional small fire-places must be attached on one side, so as to bring the flame into the fourth hearth.

The Work of the Mints.

The diminished production of gold and silver on the Pacific coast has seriously affected both the amount of deposits and coinage at the mint in this city during the past year. The coinage at the mint was \$13,000,000 less of gold, and \$6,000,000 less of silver than in 1878. The director of the mint gives the following figures: Value of deposits during the fiscal year 1880, \$39,387,949; amount of coinage, \$36,053,000, showing a decrease as compared with the preceding year of a little more than \$4,000,000 in deposits, and almost \$6,000,000 in coinage. The value of the bullion deposited at the Carson City mint during the fiscal year 1880, was \$551,885, and the amount of coinage \$654,796.

\$289,000. The coinage of gold, although heavier than in any previous year, could not keep pace with the deposits, and \$38,468,874 gold bullion remained uncoined at the New York assay office and Philadelphia mints at the close of the fiscal year. The mints, however, augmented the circulation \$84,370,144; adding \$56,157,735 gold, \$27,942,437 silver and \$269,971 in minor coins. The total purchases of silver bullion during the year amounting to 2,426,257,138 standard ounces, at a cost of \$24,972,161, being an average purchase of \$2,081,013 worth of silver bullion per month. The average Treasury Department price of silver bullion of British standard during the year was 52 7-10d. The total coinage of standard silver dollars has been \$72,847,750. The amount on July 1, 1879, was \$7,653,649, and on July 1, 1880, was \$19,309,435—an increase in circulation during the year of \$11,655,786. The circulation was further increased to November 1st by the issue of \$6,453,856, making a total in circulation at that date of \$25,163,291. The remainder of the coinage, \$48,934,459, was in the Treasury, \$19,780,241 being held for the redemption of silver certificates

Misrepresentations in Mining.

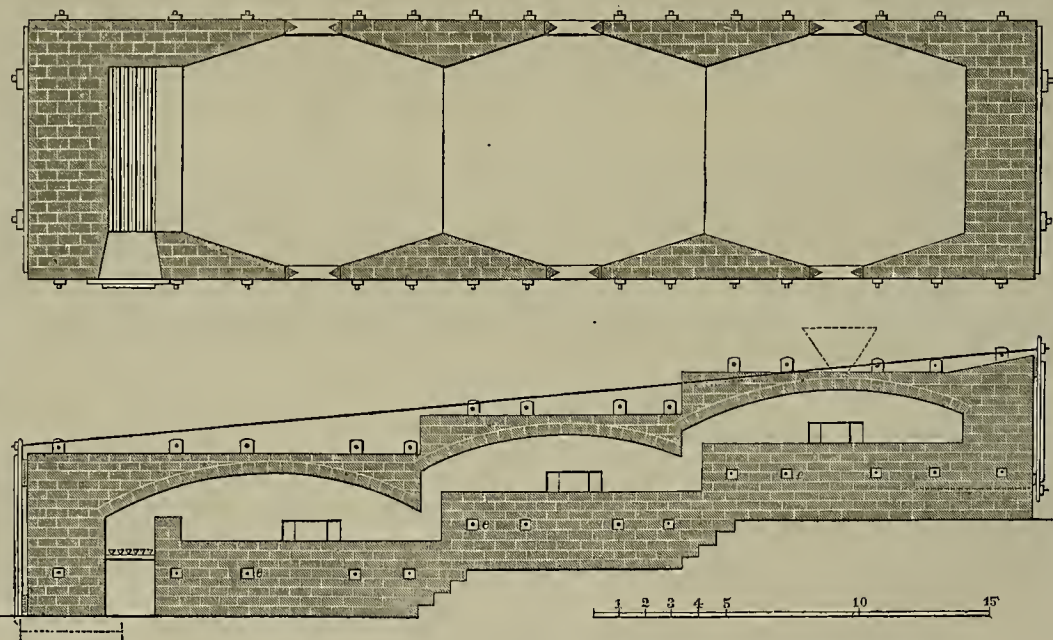
It never does any good to make too much stir and too much talk about a country before the country warrants it; and it is bound to do absolute harm if falsely extravagant reports are circulated. People read of and listen to accounts about a new and unsettled region with the greatest interest, and swallow the stories told with the greatest avidity. Those who take advantage of this weakness of human nature ought not to grumble when the natural results follow. When people extol their neighborhood to the skies, knowing all the time that the statements they are making are exaggerated, they should not complain if those who find out the falsity of the stories, should do their best to get even by running the country down and doing it harm. Last year and year before, it seemed as if the mining world was crazy on Colorado. The Leadville excitement brought thousands of people into Colorado, and it brought thousands into mining who had before never thought of the subject. Highly sensational and extravagant reports of the country were scattered far and wide. The same stories were told of the Gunnison country and of the Ute reservation. The attention of a large mass of people was turned to the country, and naturally there were thousands who went there expecting to make an immediate fortune, who failed to do so. But now that the stories about this country are found to be exaggerated and the excitement is over, a sort of stagnation has set in, which is far from pleasant. Of course, there are good mines there, some of them paying first rate, but this wild and false statements about the country generally have caused a reaction which is doing Colorado harm.

These mines are no less inexhaustible than other mines. They are no richer than other mines. The excitement is over, and people buying mines there will do so on the merits of the rock, in the future. Investments will be made more soberly and with better judgment, all of which will be better for the country.

We notice a disposition, just now, to give the other side of the question in relation to some of the Arizona properties. Reports from there are not very conservative, to say the least. Descriptions of some of the mines and camps have been rather highly colored. A good many Nevada miners have gone down there, and they do not all speak so highly of the country as they might. In some districts they say the rock is so soft that one man will do as much work as it would take five to do in Nevada. In other places they say the ground is all taken up, and the ledges are not so good as represented.

The local papers should check the too-glowing enthusiasm of their correspondents, when they know the statements are exaggerated. Stick to facts, as it will be better for the country. New Mexico is just now attracting a good deal of attention, and no doubt we will soon see the same sort of statements about that Territory. People who are attracted to a locality by false reports always leave and denounce the whole country.

Six men are at work taking ore from the croppings of the Lady Bryan; royalty, one dollar per ton. They have chartered a little mill down the canyon at which they purpose to reduce their ore. They have been at this business now some six weeks, and have a large run ready to mill. The Enterprise says that the ore taken out averages about \$30 per ton.



SECTION AND PLAN OF LONG FURNACE FOR ROASTING GOLD AND SILVER ORES.

Owing to the great reduction of the stock of bullion at this mint coinage was suspended from October, 1879, to the middle of last April. The appropriations recommended by the director in his report for the San Francisco and Carson mints for the next fiscal year are precisely the same in amount as the appropriation made at the last session of Congress for the current year, namely: San Francisco—Salaries, \$24,900; wages of workmen and adjusters, \$265,000; incidental expenses, \$80,000. Carson—Salaries, \$23,550; wages, \$72,000; incidentals, \$30,000. The production of gold and silver in the United States during the fiscal year is estimated at \$36,000,000 gold and \$37,700,000 silver. It is estimated that probably \$5,500,000 gold and \$4,000,000 silver of domestic productions; together with \$2,500,000 gold and \$6,000 of silver, United States coin were used in manufactures and the arts, besides melting up plate, jewelry, foreign coin and bullion sufficient to make the total consumption in the United States, \$10,000,000 in gold and \$5,000,000 silver.

The work of the mints has been unusually heavy, the deposits of gold aggregating \$78,835,000, or \$30,000,000 above the previous highest year. The chief source of gain was from abroad. The deposits of silver were only exceeded in 1877-8, during the coinage of fractional silver and trade dollars. The receipts of domestic silver bullion was \$2,500,000; foreign coin and bullion, \$2,225,000; American coin

and \$28,304,218 for distribution; of the latter, \$12,918,505 was held in the mint.

BEACH MINING.—P. T. Dowling and William Wellock of San Francisco, who have been stopping at Santa Monica for some days, have discovered gold on the beach, about three miles south of that place. Considerable excitement exists, and claims have been staked out all around. It is said that some claims will yield \$3 per man per day. When any one makes steady wages at beach mining we would like to hear of it. Gold is found all along our ocean beach, but it is very fine indeed and difficult to save. Every year or two we have one of these "beach discoveries," but they seldom amount to anything.

NORTH SAN JUAN is now in a prosperous condition. The certainty that it will soon have a railroad to this place has given new life to the people and created a "boom." Town lots have become valuable and new buildings are being constructed all over the town site. The Times says "give me the railroad, that's what we want and must have." A railroad to this place would enhance the value of property 100%.

FIFTEEN of the 45 collieries of the Philadelphia and Reading company have suspended for December. 3,000 men are out of work.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS

A Trip Down the Coast.—No. 2.

EDITORS PRESS:—Los Angeles may remain the commercial center of southern California, but Wilmington can never become its chief seaport. The only port I know of whose entrance exceeds in difficulty and tortuosity that of Wilmington, is Bilboa, in the north of Spain, where the windings of the semi-navigable Neroon have originated the sailor phrase "in the hilboes," which is equivalent to being in a tight place.

The steamer anchored, at about 9 A. M. on Sunday, out in the ocean, some six miles from Wilmington. The alternative, caused by the peculiar facilities of the port for dearkation and embarkation, was to loaf away the day on board the steamer, or to go ashore. Wilmington is whitewashed, so it can be seen before it is reached. It contains a store or two, a post-office, a saddlery, six or seven saloons at least, some warehouses and sheds, and a few cottages. It stands on the angle of a wide flat plain of alluvial silt, a dried up continuation of the mud flats of its bay. It is a good place to shoot ducks and snipe, and would make a good Eden for a Mark Tapley to live in.

Seeing nothing attractive about the place, I essayed to walk to the ocean beach, which was said to be two miles away. After walking three, I reached a salt water slough, at or near the mouth of the San Gabriel river, and found that it was necessary to wade to reach the ocean beach, the sand dunes of which looked provokingly near. So I was forced to content myself with picking up a few marine shells (enough to attest the richness of the ocean shore I could not reach), and one or two brackish water species. The steamer left its anchorage about 10 o'clock in the evening, the whole day having been spent in loading and unloading freight into and out of the lighters. If the steamer and railroad can be brought together without the intervention of these lighters (and Wilmington people say they can), the spot may claim to be at least what now it is not—a landing place.

Before leaving San Francisco my friends had painted for me a picture of San Diego, so graphically desolate that I felt certain the reality could not be worse. The only trees in the place, they said, were two palm trees three miles out of it; the only crop, cactus; the only soil, dust, and the only water 40 ft. (more or less) under ground. The last allegation is true, except when it rains, as it did to-day; but the others must be taken *cum grano salis*. The trees planted by the early settlers (I don't mean the padres, but the Americans who have gallantly stuck to the place through thick and thin) have now grown into trees sufficiently large to overtop the houses and give the place quite a pleasant aspect when viewed from the bay. I need not say what trees they are. They are the same your Californian plants everywhere he settles; the same that monotonously fringe the flat avenues of Oakland, and wave among the sand dunes and behind the wind-guard of San Francisco. O blue gum, pepper and Monterey cypress! cannot a man escape from you even in this remote angle of this large State?

San Diego looms large upon the maps of the dealers in real estate. There is Newtown, Midletown and Oldtown; there is Roseville on the promontory, at the northern end of the bay; there is a town laid out upon the peninsula of San Diego, between the bay and the ocean, and there is National City. The good old saying about a "city of magnificent distances" is in the mouth of every one. But the railway will change much, if not all, of this. So hope the natives, and so, apparently, thinks the railroad company itself. The railroads that on former occasions were talking of coming to San Diego, never bought a yard of land, and never did anything else beyond grading a few miles of track. The present one has acted quite differently. It has bought the Bank of San Diego building; it has bought large tracts of land within the boundaries of San Diego City, and it has bought five-sixths of the National ranch, some 11,000 acres. It has entered into a contract with the citizens of San Diego to connect their city with the railway systems of the Eastern States, and in return for this the city of San Diego will give it large tracts of land within its limits, so that altogether, upon the fulfilment of the contract, the railway will own from 9,000 to 10,000 acres within those limits.

The terminus and works will be at National City; the principal freight and passenger station at a point immediately to the east of San Diego, and thence the railway, passing by Middle and Old Towns, will proceed to San Bernardino. A considerable tract, about 450 acres, immediately east of the present wharf is among the land given by the city on the conditions above mentioned, and it is upon this spot that the depot and wharf of the railway company will be built.

This is the best location upon the bay for the transference of freight, for here a denth

San Diego is 2,200 ft. long, with its terminus in 20 ft. of water. Below the site selected the water shoals rapidly, and the channel becomes narrower, so that at National City, some three or four miles from San Diego, a pier 2,500 ft. long would be needed to reach 19 ft. of water at a spot where the channel is so narrow that great expense would have to be incurred to dredge a basin efficiently wide for a vessel to turn in. For these reasons, the people of San Diego have little fear that their interests will be sacrificed for those of National City, notwithstanding the large interests acquired at the latter place by the railroad through the purchase of the Kimball ranch. The railroad, although incorporated under the new Constitution of California, under the name of the California Southern, and with enough of its shares owned by Californians to comply with the law, is really controlled by the same men who own and control the Atlantic and Pacific, which it is under contract to meet, and the Atchison, Topeka and Santa Fe, the construction of which has already proved so signal a success. It is on account of this that the San Diego people feel now so confident of a prosperous near future. The Boston men who control these railways are too rich and too sure of success to be hought off by the reigning monopoly of California. Perhaps the new monopoly may be no better than the old, but the Eastern people who come here think better of, and hope for better treatment from the Bostonian grandees than from the Californian, and at any rate competition will reduce fares and freights.

The National ranch has been purchased with the view of carrying out a vast colonization scheme. The whole of the large tract is to be cut up into small parcels and sold to settlers, who are to be brought from the Eastern States on favorable terms. The whole of the ranch is what is known as *mesa*; that is, it is tolerably flat and moderately elevated land forming part of the large table or terrace on which San Diego is situated. These lands have hitherto been left uncultivated, except in places where streams that have existed, or that in winter still exist, have scooped out shallow valleys, sheltered by the higher mesa from the winds, and in some cases having a deep alluvial soil. It is claimed, however, by many, that the mesa will bear all that the valleys will, and that the frosts (for occasionally there are slight frosts even here) touch the valleys when they miss the higher mesa. That wells must be dug deeper to procure water is admitted on all hands; but the idea is to procure water for the irrigation of the colony from the Sweetwater river, which runs (when it runs) some 10 miles below San Diego. I say "when it runs" because, except during the winter and spring, the rivers of this section of California do not run, but become dry beds of sand and gravel. But there is water underneath. The water supply of San Diego is procured from the bed of the San Diego river, and in a similar manner it is proposed to utilize the hidden waters of the Sweetwater.

When the railroad has brought San Diego into connection with the Eastern States, it cannot long remain the small and stagnating place that it has been hitherto. With a bay 11 miles in length, the narrowness of the entrance of which keeps the channel scourged, so that there are always from 21 to 23 ft. of water on the bar at low tide, it would secure a share in the commerce of the Pacific, even were it located north instead of south of San Francisco. Its more southern position brings it nearer by 480 miles to all the ports of South America and Mexico, as well as to whatever canals or ship railroads may be made between the oceans across any part of Central America. To New Zealand and Australia it will be nearer than San Francisco. Now seated in loneliness upon her bay, the city of San Diego sees this commerce pass her by, for she is unconnected with any other city, is on the road to nowhere, and is not, in herself, market sufficient to turn any portion of it from its course to the commercial metropolis of the State. But with direct connection with the interior and the East, a portion of this trade will fall to her share, while by the new facilities offered for travel and freight, the goods and passengers carried will increase, not only to the benefit of San Diego, but probably to that of San Francisco also. Enthusiasts prophesy a population of 50,000 or 60,000 here within five years, but minds of more moderate mold are content to hope for 15,000 or 20,000, and from present indications, there appears little reasonable doubt that the expectations of the latter will be realized. Such a growth would not be excessive, nor would such a population be more than the resources of a county almost as large as the State of Massachusetts could find business for in its capital.

W. L. LOCKINGTON.

San Diego, Nov. 25, 1880.

THE Richmond Con. mining company paid a quarterly dividend of \$2.50 per share at the office in London on the 10th of November. This makes a total of \$1,856,000 received in dividends from this mine.

THERE is no quicksilver mine now working in the Geyser region. But to the southwest both the Great Eastern and Mount Jackson companies are pushing things vigorously.

THE Manhattan mill last week reduced 1542 tons; value, \$45,268.57, \$3,715.25 being from custom ores, \$12,332.27 from tribute ores. \$15.

The Skagit Mines Failure.

The British Columbia *Colonist* learns the following facts about the Skagit mines from John Welsh, who left there at the end of October:

The water was very low, and so were mining matters generally. There were about 50 men there when he left. Fully 300 men had left the mines disgusted within the last month. Miles of wing-dams, scores of water-wheels, pumps, machinery, tools, cabins, sluices, lumber, all abandoned. Thousands of feet of lumber strewn the sides of the creek for the first freshet to carry away. Everybody has become demoralized. About 20 companies got to hedrock and cleared nothing to speak of. There has been nothing found in the deep channels of any of the creeks, nor in the hills. The few men left there are working in a streak of top gravel that pays in spots small wages. There are some 20 or 30 men sinking on the main Skagit river, making a bare living. About 30 men will winter in the country. Having their provisions laid in, they think they can make \$3 or \$4 per day. So ends the latest mining excitement. About 1,000 men visited the mines during the summer; 22 lives were lost by drowning and other accidents. Hundreds suffered untold hardships and misery in trying to prospect their claims. The country has been hard on the Puget Sounders, a good many of whom mortgaged their property in order to raise money to pay their claim assessments on Ruyh creek. About \$10,000 in gold was taken out altogether, and over \$50,000 in cash was spent, besides the time and labor.

Mining Districts of New Mexico.

A correspondent of the New York *Mining Journal*, writing from Silver City, New Mexico, gives the following information about the districts thereabouts:

About 80 miles northeast of this place lies the Lake Valley district. Considerable ore has been shipped from this district to the various reduction works, principally to Denver, Colorado, and has yielded generally from \$500 to \$1,500 per ton. Several of the mines have enormous bodies of this ore. Wood and water are convenient here, and the mines are easily accessible.

About 12 miles from Lake valley lies the Hillsborough camp. A great amount of gold has been taken out of these placers during the past few years, but there still remains ground for many years' work.

Eighty miles northwest of Silver City, and in the southwestern corner of Socorro county, in the Mogollon mountains, lies the rich and promising Cooney mining district. It has an abundance of cool, clear water, with timber enough to supply the whole of New Mexico for a great many years to come. The lodes are large, in some instances cropping above the ground 80 ft. and the ore is high grade, carrying copper, silver glance, gray copper, native, brittle and ruby silver and bromide of silver.

Eighty miles below this district is the beautiful and productive valley of the Frisco. This river supplies water power enough to run an enormous amount of machinery, and as the roads from the mines there are of good grade and easy of descent, the mining and treatment of ores can be managed to the greatest possible advantage. This is destined to be the leading high-grade silver-producing district of the southwestern country.

About 10 miles north of Silver City lie the Pinos Altos mines. This was originally a placer camp, and flourished for about 15 years, during which time a very large amount of gold was taken out. It is still worked by Mexicans during the larger part of the year, who manage to get out of the old dirt about 75 cents or \$1 a day. The lodes in the district show free amalgamating gold ore, and have been worked by the rude *atrasta* and made to pay from \$15 to \$50 per ton.

Twenty-five miles northeast of Silver City lies the Georgetown district. In point of hullion yield this district is second in the Territory, Silver City coming first. It produces a carbonate ore carrying a heavy percentage of chlorides and sulphurets. The average ore of some of the mines runs over 100 ounces in silver. A 10-stamp mill and a smelter are working here constantly with fine success.

Eight miles southwest of Georgetown are the famous Santa Rita copper mines. These mines were discovered about 80 years ago, and were worked by the owners for a great many years. The ore was a red and black oxide and native copper. The hullion was carried to the City of Mexico for coinage. Owing to the high freight tariffs, and the want of shipping facilities, the present owners have not been able to work them, but with the iron rail now near at hand, operations will be commenced upon them.

The Cook's Peak mountains contain some extraordinarily large beds of carbonate ore.

The Tres Hermanas district lies about 90 miles southeast of this place. It is a new camp, and, as yet, not much developed, but shows some extraordinarily rich ores. Some specimens assayed \$20,000 to the ton, carrying horn and brittle silver. The main leads lie in porphyry, and are rather narrow, but rich.

The Stonewall district lies 75 miles southeast of Silver City, and adjoins old Mexico. It is 30 miles south of the Southern Pacific railroad, to which it has easy access by a splendid road of very light grade.

several miles on the surface. The ore is very rich, carrying silver glance, brittle silver and sulphurets, and the leads are of good width. A splendid spring breaks out in the midst of the mines, and gives water enough to run a 100-stamp mill. The mines are easy of access, close to the railroad and give every promise of permanent richness.

Thirty miles north of the Stonewall district, and three miles south of the Southern Pacific railroad, is the Victoria district. This is also a new and small district, but an exceedingly promising one. The ore is gray carbonate, carrying horn silver and chloride.

The Eureka district lies about 75 miles south of this place. This is another good camp, and has been worked successfully about two years. The ore is generally in argentiferous galena, mixed with carbonate carrying brittle and native silver.

The Shakespear or Virginia mining district lies about 55 miles southwest of Silver City, and three miles south of the Southern Pacific railroad. This district carries the largest number of veins and has the greatest amount of ore in sight in the country. Probably there is not in existence anywhere else such enormous bodies of mineral-bearing rock. The formation is granite, and the veins true fissures.

The San Simon district lies about 25 miles west of Shakespear, and is looked upon as a "coming" camp. There are a great many veins in this district, and generally they are of large size. The ores are of a fair grade and good quantity. The formation is mixed—granite, porphyry and limestone being present. This camp, like Shakespear, presents a splendid opening for capital. The mines of the Union, which have paid the largest dividends, are those carrying low-grade ore in large quantities.

North of the Gila river about 10 miles, and about 50 miles west of Silver City, some good prospects have been discovered lately. The ore is of gray copper and copper glance of a good grade. The veins are narrow, but very rich.

A FINE DITCH.—The Frost & Reere Canal and Mining Co. have been doing good work this summer. They awarded the contract for building the ditch and flume to Ledlum & Frost. These gentlemen have constructed, nearly ready for use, about 10 miles of flume and ditch, and it is considered one of the finest pieces of work of that kind in the State. The flume is six ft. wide by three ft. deep, and will carry over 3,000 inches of water. The caps, posts and stringers are made of timber 6x8 and the grade is 16 ft. to the mile. The posts that support the flume rest on solid rock. In many places the rock has been blasted and the flume placed close up against a solid wall of rock on posts only four ft. high, while on the other side a person can look down to the river, a distance of 300 ft. Over 200 men have been constantly employed all summer, and some idea of the rapidity with which the work has been done can be drawn from the fact that within six hours a standing tree has been cut down, hauled to the mill and sawn into lumber, framed and nailed in position on the flume. Very frequently 18,000 ft. of lumber has been floated down the flume in one hour's time. If good weather continues, the ditch will be completed to the mine in 20 days. The chiefs, sluices, undercurrents and gizzlies have been placed in position in the mine, and as soon as the ditch strikes the bulkhead everything is ready for work. There is one thing about this mine that the miners here would give considerable to have; and that is a good dump. From the end of the last sluice there is a fall of 1,500 ft. Such a thing as having trouble with tailings will be unknown to the owners. The mine is considered to be one of the best in the State, having been sold some time ago to Boston capitalists for the sum of \$200,000, and to-day there is not a dollar's worth of stock to be had at any price. There is a face of gravel over 200 ft. in height, ranging from one mile to a mile and a half in width, and running back along the ridge for over five miles—an almost inexhaustible supply of gold-bearing ground. Messrs. Frost & Ledlum deserve great credit for the workmanlike manner in which the ditch and flume have been built; also for their promptness in completing the work.—*Oroville Mercury*.

CAMPS OF SOUTHEAST CALIFORNIA.—The new discoveries of gold and silver in the Mojave district are far beyond what is generally known. The rock is rich with metal from the grass roots down. A large number of men from Los Angeles, Pasadena and other places are busily at work, opening mines, making ditches for water, etc., while others are prospecting and assaying. James Noel, President of the Sanchez and Soledad mining companies informs us that vigorous work will be recommenced in a few days on these valuable mines which were opened last summer. Some fine hullion was taken from the Sanchez mine in the summer and plenty of rich smelting ore is in sight. The gold mine in which the Pasadena and Los Angeles people are interested has a water ditch nearly completed that will carry 4,000 inches of water and a first-class new 10-stamp on the way to be stamping out the golden nuggets before New Year. A gentleman just returned from this mine assures us that there is a million dollars in sight. Oro Fino, has three shafts 10 ft. deep and assays \$800 per ton. The Oro Grande, the Garfield and the Buena Vista, belong to the same parties. From the latter some assays of

MECHANICAL PROGRESS.

Forms of Cutting Tools.

Perhaps there is no greater hindrance to improvement in the mechanic arts than the content that is satisfied with present appliances and the prejudice that refuses to believe that an improvement can be made. This conservative sentiment extends to all matters affecting our lives, and sometimes is ludicrous in its complacency. With thousands no almanac can compare with the "Old Farmer's Almanac," by Robert B. Thomas.

It is held by some progressive mechanics that our present system of working metals, after they are cast or forged, is wrong, or is susceptible to some almost radical improvements. They hold that the plan of a stationary tool, held at a certain angle against a revolving shaft is not best, or that the shape of the cutting tool is not best, or that some essential modifications should take the place of our present practice. It is not the intention of this article to consider all these objections, nor to assume to dictate in any one of the improvements suggested, but simply to confine comments to some proposed innovations. And these relate to the forms of cutting tools with reference to the materials to be wrought.

Every mechanic will agree on the obvious fact that a form of tool adapted to a hard, rigid substance is not, therefore, adapted to a soft, yielding substance. The worker in metals knows that he must grind a turning tool for copper and its compounds different from the form or angle to which he would grind a tool for cast or wrought iron, or steel. So much can safely be allowed.

But it is a question whether a similar distinction is applicable, also, to the differences between wood and metals. And yet a mechanic of some 40 years' experience contends that the action of a turning tool is, or should be, the same whether the material to be turned be wood or metal. The fact that this difference has always existed and been recognized in practice does not prove he is wrong. It may be that we have been, for 40 years and more, following tradition rather than observing practice.

The ordinary practice is to have the entering portion of a metal turning tool somewhat higher in relation to the center than the after cutting portion. The effect of this form is to lift outward from the center the material to be removed. The observant mechanic insists that instead of this lifting outward there should be a shaving downward, precisely as the wood turner's chisel acts. Everybody who has turned wood, or has noticed the process, knows that the work is done from the exterior toward the interior, and not from the center outward. He proposes that the "point" of the tool should follow the cutting surface, just as the work of the beveled edge of the wood turner's chisel begins with the surface and ends with the finish. In short, he would shave off the outer surface instead of cutting down to the finish surface. He illustrated it by the use of an ordinary pocket knife, cutting a spiral circle around a piece of wood.

There may be sense in his suggestion; there certainly is sense in it where the outer circumference is irregular. In such a case the surface irregularities should be removed by the "shaving" or surface process. But when the revolving object has assumed a proximate cylindrical form, it may be questioned whether his system is thoroughly and in all cases correct.

This subject is one for experiment rather than rule, and probably may be elucidated by tests rather than settled by dicta. Certainly, when old time workmen differ in regard to the proper shape of cutting tools for metals, and some experienced mechanics reject the records of their experience and turn approvingly to the tests of their experiments, it is not improper to suggest that possibly our old fashioned methods are susceptible of improvement. There are occasionally opportunities offered in almost all shops for experiments which may revolutionize the entire system of tool shapes now in use for working metals.—*Boston Journal, Cor.*

INVENTING.—Inventing to-day, says the *Iron Age*, can be classed among the exact sciences. It is no longer a matter of happy accident, or even sound mechanical judgment. The world has progressed rapidly during the last 30 years, and to-day we find that the merely ingenious man can do but little that is of value to the world; in other words, something more than ingenuity is necessary to the production of a successful invention. Thirty years ago a good mechanic could hardly spend an hour in a shop without seeing an opportunity for improvement in something, and at that time what was true in one shop was true everywhere. Since then a whole generation has been steadily at work improving and inventing; mere ingenuity has exhausted its powers and even originality has but a limited field in which to seek profit in inventing. The first task of the inventor now is to discover a want; he must then find out whether any attempts have been made to meet this want; if so, how, when, and by whom; in other words, he must learn the state of the art, so that he may avoid traversing the foot-steps of others who have failed. These are not matters which can be guessed at; they call for careful study, and when he has learned all he can about the subject, he is ready to attack the

About Filing Saws.

The all-absorbing question of the present day among mill men seems to be, how can we run thin saws? Now, the practice of many filers is to use a beveled face, or beveled backed tooth—or both—claiming that it cuts easier and runs straighter than any other. Having learned this when young, they conscientiously think that it is all so, and as it is very difficult for most men to file a square tooth, they stick to the old bevel, and will not try the square. This is their practice, and this class of men number about one-half the filers.

In some sections all filers use this absurd old-fashioned tooth, which practice has already said was wrong. We will look at this phlebotomy in a theoretical way. It is a well-known fact that all hand-filed saws get "out of space," that is, alternate spaces between the teeth get wider than the others, consequently, the teeth following these spaces have more work to do than their fellows, and, as each draw outward, the teeth having the most to do—and they are all on the same side—will pull the hardest, and the saw be drawn that way just in proportion to the amount of feed carried or the work done, and no amount of hammering, tinkering or grinding will prevent this continual pull and hard drawing, so long as the phlebotomy tooth is used. Then we will look a little further and see what theory has to say against this beveled tooth. The filer must give his saw all the set necessary to clear itself upon, running on slow feed, and when forced to carry heavy feed, the teeth will be drawn outward all that they will spring, increasing the width of the cut from 1-16 to 1/8 of an inch, although the saw may go perfectly straight. This condition of things will make the lumber thicker at one end than the other, and as all saws are generally started in on slow feed, which is steadily increased, until the other end is reached, there is a taper on both sides of the board. Then again, when these teeth run into a hard knot, they are suddenly drawn in opposite directions, making the saw cut wider and consequently very much harder. This sudden wrench has been the cause of breaking more saws than any other one thing.

There are reasons enough why a man who files a phlebotomy tooth cannot run thin saws, because they are more sensitive than thick ones, and show the defective fitting more readily, and no filer ever fitted thin—if hammered right—with a perfectly square tooth, top and bottom, who could not run them and do good work. At least, of the hundreds of mills I have visited in the last three years, I have failed to find one. If mill owners would require their filers to swage the teeth full and heavy, giving them one-fourth of an inch side joint, with a comparatively steady motion, a 10-gauge saw can be run just as easy as a 6-gauge saw. No man should ever use a taper saw, for if it be tapered on one side and straight on the other when standing, it will be tapered alike when running, as the centrifugal force will straighten it up and put twice the strain on one side that there is on the other, making it more liable to break. These theories can be proven by any mill man, without cost, in his own mill, and will enable him to show himself practical as well.—*W. L. Covey, in N. W. Lumberman.*

ANIMAL FAT AS A LUBRICATOR.—Three or four years ago some of the mechanics in the Pennsylvania railroad shops were overhauling an engine, and they found a peculiar irregular run worn, or rather eaten, half an inch deep, several inches long and from one-quarter of an inch to an inch in width, into the steel of a steam chest. It was evidently the result of the action of some rapid and powerful corrosive, but its source was a mystery. For the oiling or lubricating of steam chests or cylinders a preparation of tallow is used. The company's chemist began a series of analyses to determine the cause of such rapid decomposition, and after considerable experimenting he discovered it. He found that where animal fat is allowed to lie a long while before rendering, the decomposition sets free in large quantities stearic, palmitic and oleic acids, and that the stearic acid, heated to the temperature of steam, acted very rapidly in decomposing iron. This at once yielded a clue to the corrosion found in the old steam chest, and now every barrel of tallow used by the company is subjected to analysis to determine whether it is made of new fresh fat, or whether it is charged with the various acids due to decomposition.

STEEL BOILERS.—In an article on steel boilers, the *Engineer* says: While we admit that excellent boilers have been made of steel, we cannot shut our eyes to the truth that a great deal of an apparently admirable metal is quite unsuitable for this purpose. This Bessemer steel, it is said, cannot be used for boiler plates with any certainty of obtaining a satisfactory result, and the reason appears to be this: The whole process of clearing comes five tons or so of iron from carbon, silicon and other impurities occupies nearly 20 minutes. When the contents of the ladle are under-blown or over-blown, the steel is unfit for boiler-making. In the Siemens-Martin process, however, the chances of spoiling the steel are much less. In working that system, if the metal be tapped half an hour sooner or later, the difference in the quality of steel would not be so great as an error of a minute would produce in the steel of the Bessemer

SCIENTIFIC PROGRESS.

A Delicate Instrument.

Prof. S. P. Langley, of the Allegheny observatory, read a very interesting paper at the recent meeting of the National Academy of Sciences, in New York, on the "Measurement of Radiant Energy," in which he described a novel and very delicate instrument, which he had found it necessary to devise to take the place of the thermopile, which he found was not sufficiently sensitive for his purpose. The apparatus is founded on the principle that if a wire conveying an electric current be heated, less electricity flows through it than before.

The application of this principle is thus made: Iron or steel is rolled into sheets of extreme thinness. Of these sheets 50 laid one on the other did not together equal the thickness of light tissue paper. Minute strips, 1-32 of an inch wide and 1/4 of an inch long, cut from this were united so as to form a prominent part of the circuit, through which a current of a powerful battery passed to the galvanometer. Experiment proved that an almost inconceivably minute warming of a set of these strips would reduce the passage of the electricity so as to produce very large indications on the registering instrument. The instrument thus formed was from 10 to 30 times more sensitive than the most delicate thermopile; but this was almost a secondary advantage compared with its great precision and the readiness with which it is issued. The thermopile is very slow in its action. This new instrument, which he calls the thermal-balance, takes up the heat and sets with it again in a single second. It is almost as prompt as the human eye itself.

To show its sensitiveness, the statement was made that it would register a change in temperature of the iron strips, just described, which did not exceed 1-50,000 part of a Fahrenheit degree. When mounted in a reflecting telescope it would record the heat of a man or other animal in a distant field. It would do this equally well in the night, and might be said, in a certain sense, to give the power of seeing in the dark. A more valuable proof of its efficiency was shown in a series of measurements of the heat of the moon, made under varied circumstances, to guard against error, but each made in a few seconds. All agreed in showing that the almost immeasurably minute amount of heat from the moon could be certainly measured by it, even with a common refracting telescope.

BALLOON PHOTOGRAPHY.—An interesting paper on balloon photography, giving a detailed account of the results of some experiments made by M. De Fonville, in the neighborhood of Rouen, on the 14th of June last, is contained in a recent number of the *Spectateur Militaire*. Two views of the surrounding country were taken during an aerial excursion, from a height of about 3,300 ft., while the balloon was traveling at the rate of 20 to 25 feet per second. The views were taken from the direction opposite to that in which the balloon was traveling. Miniature views were obtained of territorial sections about 23 acres square, upon which roadways, house roofs, garden walls, hedges are plainly discernible. Had the sky been perfectly clear, M. De Fonville entertains no doubt that every human figure within the scope of the lens would have been distinctly visible in the pictures obtained, and he points out the obvious availability of balloon photography for supplying exact information respecting the dispositions of an enemy's camp and the number of his forces in war time, the operator being safely beyond the range of any projectile susceptible of discharge from a rifle or other "arm of precision." The objections to the utilization of balloon photography for military purposes are the rapid movement of the balloon, which interferes with the distinctness of the picture, and the impossibility of steering the balloon so as to impart to it exactly the desired direction.

ELECTRICAL PHENOMENA IN TROPICAL COUNTRIES.—In a note addressed to the French Academy (*Comptes Rendus*, p. 446), M. L. Amat calls attention to the fact that the electrical phenomena produced by the friction of the hairy coat of animals, acquire a remarkable intensity in tropical countries, especially to the north of the Sahara, toward the 35th degree of latitude. At an altitude of 2,500 to 3,600 ft., he found that by passing a comb through the hair of the head or heard, sparks might be produced two or three inches in length. The phenomenon occurred at its best at from 7 to 9 o'clock in the evening, when the weather was warm and dry. In horses the effects are still more marked, and the hairs of their tail extend out from each other so as to form a sort of fan. If the hairs be touched, a crackling of the sparks is heard, and at night these are distinctly visible. Sparks are also easily produced by the use of the brush or currycomb. According to M. Amat, the electricity developed in the tail of the horse is positive, as he learned by experiment. Naturally, during rainy or moist weather, the electrical tension is considerably lessened, and it is likewise less sensible in the stable than in the open air. In man the accumulation of the electric fluid is not so great as in the horse, doubtless because he is not so well insulated from the earth as the latter, the horny

Spontaneous Combustion of Coal.

Herr Haedicke, of Hagen, Germany, has been making some investigations on the causes of spontaneous combustion of coal, which indicate that some of the views now held relating to the subject are erroneous. It has been quite generally believed that the decomposition of the pyrites often contained, finely distributed in coal, and the increase of temperature due to that decomposition, were chiefly responsible for the greater number of accidents reported as having arisen from "spontaneous combustion." Herr Haedicke has endeavored to produce ignition of coal artificially, and though his experiments were conducted with materials differing in their nature from those in coal, his results are not without some significance. It should be stated that far from overrating their value, he insists that they be looked upon as preliminary only. He took small pieces of charcoal, soaked them in sulphate of iron and then treated them with sulphide of ammonium, thus impregnating them with a sulphide of iron. Placing them into a glass tube he exposed them to different temperatures, at the same time forcing a gentle current of oxygen through the tube.

He found that ignition took place only after a temperature of about 300° Celsius had been reached. Ozone did not cause an ignition at a lower temperature, nor did powdering the charcoal affect the general result. On the other hand, saturation of the oxygen with steam prevented any ignition, even at a temperature of 360 degrees. The result was a little different when the sulphide of iron impregnating the charcoal was produced by soaking it in an ammoniacal solution of sulphate of iron and passing a current of sulphuretted hydrogen over it. In this case the temperature of ignition was about 200° to 220°, while sulphide of iron by itself ignited at 200°. It is important to state that no combustion of the impregnated carbon took place when a current of atmospheric air was passed over it instead of a current of oxygen.—*Iron.*

HISTORY AND LIMITS OF THE VOICE.—Dr. Delauney, in a paper read before the French Academy of Medicine, gives some details on the history and limits of the human voice, which he obtained after much patient research. According to the doctor, the primitive inhabitants of Europe were all tenors; their descendants of the present day are baritones, and their grandsons will have semibass voices. Looking at different races, he calls attention to the fact that inferior races, such as the negroes, etc., have higher voices than white men. The voice has also a tendency to deepen with age—the tenor of 16 becoming the baritone at 25, and base at 35. Fair complexioned people have higher voices than the dark skinned, the former being usually sopranos or tenors, the latter contraltos or basses. Tenors, says the doctor, are slenderly built and thin; basses are stoutly made and corpulent. This may be so, as a rule, but one is inclined to think there are more exceptions to it than are necessary to prove the rule. The same remark applies to the assertion that thoughtful, intelligent men have always a deep-toned voice; whereas triflers and frivolous persons have soft, weak voices. The tones of the voice are perceptibly higher, he points out, before than after a meal, which is the reason why tenors dine early, in order that the voice may not suffer. It was almost superfluous for him to remind his learned audience that singers who were prudent eschewed strong drinks and spirituous liquors, especially tenors, for the basses can eat and drink generally with impunity. The South, says the doctor, furnishes the tenors, the North the basses; in proof of which he adds that the majority of French tenors in vogue come from the south of France, while the basses belong to the northern department.—*Scientific American.*

WHAT IS INSTINCT?—Instinct is defined by G. Glaser, in the *Scientific American*, as "nothing else than an obscure remembrance of experiences which were made by earlier generations. A clear remembrance which extends over the boundaries of our individual life has, it is true, not yet been found among men, but this does not prove anything against the above assertion. Such a remembrance we do not possess, even for the complete period of our present life. Our memory does not extend back to the first years of our infancy. It is interrupted by sleep; it may be strengthened by exercise or weakened by neglect; it may be interrupted by many abnormal states by which life itself is not interrupted. Whether in dreams, or in conditions of abnormal nervous excitement, in hysterics or other sickness, memory is increased, so that it really extends over the period of our so-called individual life, is a question which, although much abused by humbugs and impostors, might still arrest the attention of the scientific investigator. And though it remains an open question whether the memory of man has such an extension, and though even for the human race the contrary may be proven, it nevertheless might be possible that some animals are endowed with a memory which reaches far beyond their so-called individual existence."

CRYSTALS OF HÆMINE.—F. Hoyer has examined crystals from the blood of men, oxen, swine, sheep, dogs, cats, rabbits, guinea pigs, mice, pole cats, poultry, pigeons, geese, ducks, *Rana esculenta*, and *temporaria*. All have one only crystalline form. They belong to the monoclinic or triclinic system, probably the for-

There are only 5 men at work in the mine and 2 at the mill, which goes to show that the daily yield, as stated, is profitable. The Alpha hoisting works and mill are driven by steam and a 20-horse power engine. The latter is the result of a crushing in the Golden Gate claim was given. That claim adjoins the Alpha on the west, and the crushing of rock taken out was from the same pay eluto on which the Alpha is working, and the latter has a large piece of ground between the present working drift west to the boundary line between the 2 claims, and, therefore, the Alpha owners feel assured of good pay rock for a long time to come—at least 12 months on the present level—without sinking any deeper. The Alpha prospects are very good indeed, and the owners feel that that mine gives assurance of profitable working for years to come.

GOLDEN GATE MINE.—A nice clean-up has just been made at Sothern's mill of 47 loads of quartz taken from the Golden Gate mine by tributaries. The result was \$1,021.50 or \$34.50 per load. The rock was taken from a drift from the incline at the depth of about 230 ft. The Golden Gate is an adjoining claim to the Alpha on the west, and on a ledge parallel to and several hundred ft north of the Idaho. The ground is owned by Poyser, Howe and Treweek, but is not regularly worked, and its machinery upon it is a horse whim. Of late a company of tributaries have been at work in the mine, and the above is the result of their first crushing. The ledge sneaks a width from 18 inches to 2 ft, which is about the same as found in the Alpha. This crushing may induce the owners to put on a good hoisting and pumping rig by which the work can be done in the mine to better advantage. There is certainly encouragement for this to be done.

BLUE BASIN MINE.—The sale of this hydraulic claim at Moore's Point is likely to have an excellent effect. The purchasers are Eastern men of means, and as the mine is a good one, has been placed under good management and will be extensively worked. We are satisfied that the investors will shortly reap good returns that will lead other Eastern capitalists to see the wisdom of investing in Nevada county properties. The first report as to the amount paid for the claim was, we are now told, too high. The owners of it received about \$10,000 apiece.

A MINING TRANSFER.—Piero Humbert, Jr., has acquired title to the Bear River tunnel tunneling and mining company's properties, which begins at a point about half a mile below the junction of Greenhorn creek with Bear River, and extends upwards along the latter and its tributaries a total distance of more than 22 miles. He has also bonded D. D. Shattuck's claim in the same vicinity. It is reported that Mr. Humbert is negotiating with a strong Eastern company who, if they determine to purchase, will work the property, which is situated in Nevada and Placer counties, on an extensive scale.

ROSE HILL LENS.—Grass Valley Union, Dec. 7: The Rose Hill ledge, on Winchester hill, which has been worked in a small way for a year or more, gives promise of making a mine, judging from the different crushings that have been made. The ledge was discovered, it is said, as a blind ledge 25 ft. below surface, where it was only 6 in. thick, but at the present depth of the shaft (62 ft.) it is from 4 to 6 inches. The first crushing from the ledge was made in November of last year, when 5 loads gave 284 ozs of bullion, of the value of \$480. The next crushing, in February, of 20 loads, gave 150 ozs of bullion; value, \$2,551.25. In June last was the next crushing, of 10 loads, giving 41 ozs of bullion; value, \$670; in August, 22 loads, yielding 41 ozs of bullion; value, \$700; in September 20 loads, yielding 37 ozs of bullion; value, \$1,391.50; and on Oct. 23 13 loads, yielding 140 ozs of bullion; value, \$2,384.50, or about \$132.50 per load. This is the last crushing that has been taken out, and probably none will be during the winter, or until proper machinery is put on to handle the water. It will be seen from the result of the crushings that the quartz has been of a fine quality, and much of it very rich. It is the intention to put steam machinery on the claim and work it with system.

PLACER.

THE ACTIVITY AMONG PROSPECTORS.—Placer Herald, Dec. 4: We learn from Mr. H. P. Hanson, one of the proprietors, that the Pugh mill has run steadily on custom rock since last May, and that the general average of the ore has been very satisfactory. In addition to the work of this mill several other mills have crushed more or less custom ore, which makes the amount in the aggregate considerable, and shows better than general terms can the great amount of prospecting that has been going on, being done in this part of the country. There is, perhaps, no district in the State where prospectors, on an average, get as big returns for their work as here.

THE STORM.—Dutch Flat Forum, Dec. 4: The long-looked-for storm of winter is upon us once more. The snow commenced falling on Wednesday morning early and continued until noon, when it turned a little warmer when it set in. In the afternoon the wind was high, and the storm first came upon us, much to the delight of our miners. We understand most of the fall has been snow above Alta, although the ground has been warm enough to melt some of the first fall, while from Dutch Flat down there has been but little snow, especially below Gold Run. If the storm will end up with a warm rain and start the snow above to melt a little, all our hydraulic mines will be started up on next time, and times about this section will be livelier than for some time.

THE DEEP SHAFT MINE.—owned by the Cedar Creek Ditch Co., F. M. Chadbourne superintendent, is being put in condition for hydraulic washing as soon as sufficient water runs in the ditches, and present indications are good for an abundant supply soon.

TUOLUMNE.

PIETY HILL.—Union Democrat, Dec. 4: Work is to be resumed on the Bonanza claim, Piety Hill. J. O. Divoll has had a 10-horse power donkey hoisting engine put in place, which is now at work clearing the mine of water. There is quite a lot of water in the opinion of mining men, and work is going on in different places which sooner or later may unfold another big strike.

TULARE.

CLAIMS LOCATED.—Visalia Delta, Dec. 2: Some 11 years ago a man by the name of Stone visited Lake creek, east of this place, in this county, and found a satisfactory prospect of placer gold at a point called Rancheria flat. Business called him elsewhere, but lately he has returned in company with Mr. Harris, of Mussel Slough, and since September these parties have had several men employed in erecting hydraulic works, and preparing to mine on an extensive scale. The ground is said to be about 14 ft deep, with gold all the way down. There is plenty of water, and most of the year 1,000 inches or more of water is at hand. The presence of these parties has caused numerous prospectors to come in, and recently some 8 miles of the creek bed have been located, as well as numerous claims on the east fork of the stream. The ground has been looked over by prospectors for a quarter of a century, and it remains to be determined whether the enterprise will pay.

NEVADA.

WASHOE DISTRICT.

The following statements have been made this week by superintendents of prominent mines:

UNION CREEK.—During the past week 320 tons and 800 lbs of ore have been taken from the 1650 level, and 310 tons and 1,600 lbs have been sent to the mill; assayed, \$38.54. On the 2500 level the west drift from the upraise has connected with the winze down from the 2400 level. The drill hole from the bottom of No. 1 winze has been extended 160 ft; assays from a trace to \$10.

CALIFORNIA.—During the past week 738 tons of ore have been extracted from the 1650 level, value, \$17.82 per ton. On the 2500 level the south drift from the upraise advanced 34 ft. On this level a chamber for a joint Ophir raise is being cut out. Amount of bullion in office, \$62,761.97.

MEXICAN.—On the 2500 level the joint Ophir east winze has been sunk and timbered 12 ft, and the cages have been placed in position.

OPHIR.—On the 2500 level the joint Mexican east winze

has been sunk and timbered 12 ft; the joint Mexican west crosscut has been extended 30 ft, and the joint California east crosscut 30 ft.

VACACAY.—During the past week 337 tons of ore have been extracted; assayed value, \$25.41 per ton. On the 2300 level the south lateral drift has been advanced 29 ft. Amount of bullion in office, \$40,497.

UNION SHARP.—A tank pit is being cut out at the 1600 level, a bob pit at the 2300 level, and are casing timbers at the 2400 station.

YELLOW JACRET.—During the past week we have been employed on repairs to the pump engine. No work going on in the mine.

SILVER HILL.—During the past week our winze has been sunk and timbered 15 ft. The water in the winze is hot and increasing. All our machinery is in good order and running well.

AURORA DISTRICT.

PROSPECTS.—Esmeralda Herald, Dec. 4: Work progresses favorably in both tunnels. The mine looks well. The character of work being done at present is merely for the purpose of prospecting.

NEW ESMERALDA CON.—Under the management of Jas. S. Mooney, who has 5 men employed, work has commenced in earnest on this property last Monday. The ground comprises 5 ledges running parallel with each other, 3,000 ft long by 1,000 ft wide. The work now being done is on the two western ledges and midway of the 3,000 ft, where the company are sinking on the croppings. The ledge at this point shows a width of 8 ft, 26 inches of which is ore that assays all the way from \$60 to \$125 per ton. It is fine looking ore as we ever saw and is free from mill scale. The pay streak is growing wider as depth is attained. The ledge is very regular, and the whole country round about shows no signs of volcanic action. The owners, D. C. Simpson, O. Kimball, S. M. Booker, J. S. Mooney, F. Neal and D. J. Lewis, are confident that they have struck a big mine.

CHERRY CREEK DISTRICT.

PROSPECTS.—Esmeralda Sentinel, Dec. 5: M. Alexander, a merchant of Cherry Creek, came over in answer to a telegram from his brother, Mr. B. Alexander, who met with no accident here a few days ago. The Cherry Creekers says he prefers to stay at home rather than risk a trip by stage and winter weather, and only a matter of life or death would start him out of his place of business. Cherry Creek is improving every day. Many are dropping in from surrounding camps for a winter's comfort in that metropolis of White Pine; the mills are steadily bumping away and a new one is under construction; parties are grading the road to the Teacup mine on the mountain, and general prosperity reigns.

DUN GLEN DISTRICT.

LANE SYNE.—Silver State, Dec. 4: Vance M. Nelson, of Dun Glen, informs us that the Lang Syne Co. have been working richer ore lately than ever before, and they expected to make a clean-up that will astonish the natives. Only 2 miners are at work on the Auburn mine, recently purchased by a Chicago company, but the force will be increased to at least 20 men as soon as Supt. Purnort arrives from the East, which will probably be about New Year.

EUREKA DISTRICT.

EUREKA TUNNEL.—Cot. Sentinel, Nov. 30: This great enterprise is now completed a distance of 1,538 ft. At the breast the air is foul and retards work. The first 100 ft of the tunnel passed through a limestone formation; the next cut is through a clay or argillaceous shale nature, 300 ft in length; next through 900 ft of ore-bearing limestone, impregnated with ore of a nodular character; the last cut is through 253 ft of clay shale. Here the clay shale terminates and runs into calcareous shale of a hard nature, about 900 ft from the mouth of the tunnel is crosscut No. 1, running north about 60 ft in length, which is impregnated with ore of a carbonaceous nature, and of a bumpy character, one bunch connecting with another, as if they were the vanguard of large ore bodies, which is usually the case in Prospect mountain. About half way in this drift are upraises which contain ore about 2 ft wide of low grade. A little further along a body of manganese is seen, which runs as high as 5700 ft. Enclosed in the manganese is a body of chloride ore which has not as yet been developed, as it interferes with working in the face of the tunnel. The facilities for working the tunnel are first-class. A commodious blacksmith shop has recently been built. The conduct of the work is under the intelligent superintendence of Mr. Maurice Hartnett, who is one of the oldest miners on Prospect mountain. The time is not far distant when a large body of ore will be had in this tunnel enterprise.

LOW GRADE.—Eureka Sentinel, Dec. 5: The latest workmen in the Phenix mine say that there is lots of low-grade ore therein, but it cannot be worked to pay at present rates. They agree that it is of the same quality as that upon either side, in the K K and Jackson. Let us pray for a cheaper method, that the enormous quantities now in sight in these properties may be turned into bullion.

OSCEOLA DISTRICT.

STARTING UP.—Ward Reflector, Dec. 4: The mill at Osceola we learn from Boardman, starts up to-day on ore from the district which Osceola mines. Ore projectors of the water ditch are sinking to bedrock in a number of places, but outside of that there is but little work going on in the district. The first cold snap froze up Jack Irwin's water works and stopped what placer mining that was going on.

PIOCHE DISTRICT.

WILL SHUT DOWN.—Ward Reflector, Dec. 4: A letter was received here a few days ago dated Hamilton, November 23th, in which the writer says the Eberhardt & Aurora tunnel will shut down in a few days, and that the mill will run a month and possibly 6 weeks, when the stamps will be hung up for work and perhaps longer. We hope the writer's information is without foundation.

TO BE CONSOLIDATED.—We have received a letter from Pioche in which the writer says the prospectors good for the Raymond & Ely and Meadow Valley mining companies consolidating. This would put an end to the trouble between the two companies that has existed for the past 6 years.

SILVER CANYON DISTRICT.

PROSPECTS.—Ward Reflector, Dec. 4: J. C. Campbell, who returned from Silver canyon a few days ago, informs us that it was the intention to drop stamps on or about the 20th of December on the only mine from which any ore is at present being taken is the Sadie L., which assays from \$300, the lowest, to \$2,600, the highest. Snow was all of a ft deep in the canyon when Mr. Campbell left.

STAR DISTRICT.

MINING PATENTS.—Silver State, Dec. 4: United States patents for the Heydenfeldt, De Soto and Woolcock mines, on the Sheba lode, in Star district, have been received from Washington, and are now recorded in the county records. One of the mines—the De Soto—is being worked, and produces considerable rich ore.

WINNEMUCCA DISTRICT.

THE STRIKE IN THE PRIDE OF THE MOUNTAIN.—Silver State, Dec. 3: The ore body discovered last Saturday in the Pride of the Mountain mine promises to be the most important strike ever made in Winnemucca district. It is about 250 ft from the surface and below the break in the formation. The ore is of a different character from any heretofore found in the mountain. The ledge carries about 30 inches of solid ore, which averages over \$100 per ton, from \$10 to \$15 of which is gold. The high percentage of gold in the ore is considered a good indication of the permanency of the vein, by miners. E. P. Torrey, who is working the mine, is now prosecuting in the winze day and night.

ANTIMONY MINES.—J. M. Brown, of Unionville, is in town. He is engaged in working antimony mines in Bloody canyon, between Star and Unionville, and ships, on an average, about 23 tons of the ore a month. We understand that he is making the business pay.

CLOSED DOWN.—The Arizona mill, at Unionville, closed down a few days ago, in consequence of the Chinese, who had contracted to supply it with fuel, failing to do as they agreed. They wanted their pay every Saturday night, and as some bullion owned by Christ Lark, who has leased the mill, was attached for the Arizona Co.'s debts, he did not have the money on hand as he expected, when he shipped the hullion to pay them. The mill is doing well, and will start up again shortly.

ARIZONA.

SILVER KING MINE.—Globe Chronicle, Dec. 3: We are informed that the Silver King mill is regularly turning out bullion at the rate of \$10,000 a day, and that the ore is soft and easily mined, that very few men are required to keep the reduction works fully supplied. We are glad that the company is now turning out bullion at a rate commensurate with the size and richness of their mine.

THE CENTENNIAL.—This ore from this mine is panning out splendidly; the 5-stamp Isabella mill is turning out a big bar of bullion every day, and they can keep it at that during the contract with the milling company. Everything at the mine is progressing favorably, and in opening out a new station at the bottom of the main shaft 120 ft deep, they found 2 ft more of good ore—making the lode 8 ft wide between the walls.

BULLION.—This claim crosses the road to Miami about 4 miles from Globe. Assorted ore has been carefully sampled, which returned 153 ozs per ton, and a ton reduced at the Isabella works, unassorted, returned \$41.25.

KATY DRIVE.—This claim adjoins the Bullion on the northeast, with a capital surface show of ore. The main ledge has large mineral-stained croppings, and a shaft sunk 20 ft proves it to be over 8 ft wide, with ore all through, some samples of which yield good assays. The next claim on these ledges to the northeast is the Gringo, which has the same solid syenite formation.

ESCAMO.—This mine was favorably known about 3 years ago, but after being incorporated into its stock manipulated by a California company (who only spent about a thousand dollars in sinking the main shaft, and then allowed it to be sold by the Sheriff to the present owner), it has lain idle, except for the necessary assessment work. The main shaft is about 80 ft deep, being sunk on the inclined ft-wall of the ledge, which shows smooth and well over 10 inches thick, and has been sunk some very rich ore, but in sinking, the ore taken out would not pay without a close assaying, and so was all thrown over the dump.

REN ROVER.—This claim is on the same lode, and lies northeast from the Escamote, the surface formation being the same on both claims—solid gray syenite. Two shafts (40x40 ft deep, respectively) have been sunk on the ledge, which has a surface of 15 ft, and has been sunk out of 35 ft. The ore from the shafts and cut is very high grade, some milling samples returning a dollar a lb, and a lot of 10 tons yielding \$500 per ton.

TUE BLUE BIRD.—On visiting this well-known mine this week, which is on a parallel vein with the last mentioned mines, we found some men at work on the surface, where the main ledge shows at the top of the hill. The ore streak is over 10 inches thick, and has been sunk on about 14 ft. Assays from it will average over 500 ozs per ton. It is owned by a private stock company in San Francisco, who intend to push its development in earnest.

THE EMELINE.—This claim adjoins the Blue Bird on the northeast, and has in addition to its ledge another good parallel vein, which shows well. The ledges are in solid syenite, and show large in the lower workings, the ore streak being from 2 to 5 ft wide. About 140 tons of ore have recently been reduced at the Arizona Mexican mill, which yielded an average of \$100 of silver and \$5 of gold per ton.

GERMAN FRIEND.—Mr. Hayes is now at work on this claim, and is getting out good ore. It lies northeast from the Emeline, and is believed to be on the same ledge. A shaft is being sunk, and is now down 18 ft on the ore streak, which will average 3 ft wide. In an open cut the ledge has been stripped for 150 ft, and considerable rich ore taken from it. An average of 6 tons reduced lately yielded \$150 per ton in silver.

THE DANUBE.—The main shaft is 30 ft deep, and a sample of the ore returned 153 ozs per ton. This claim is a good prospect for a paying mine.

GOCORONA.—This is on a large ledge which crops out along the side of the hill above Independence Spring, which, as the surface shows, is over 40 ft wide, lying between syenite and quartzite formations. Two small spurs have rich ore shown in surface cuts, and the owners are now running a tunnel.

CRITERION.—This claim lies in the same section as the Blue Bird, and is located on a large ledge, which, as proven by the surface, is 15 ft wide. There are a number of open cuts and prospect holes on the ledge, which, with 2 shafts 12 ft deep, prove the continuance of ore body for a long distance.

SILVER ROUGH.—This forms one of the same group as the Criterion and Big Indian, and has a well-defined ledge, from 8 to 10 ft wide, showing through the solid syenite formation.

ELIO ISLAND.—This is the third claim in the group, and has a good-sized ledge whose width has not as yet been accurately determined, although it fills the shaft, which is 40 ft deep.

BLACK HORNET.—This lies near the last group, and also makes a capital showing of good milling ore. The ledge is large, with an ore streak which will average 4 ft wide.

THE CALIFORNIA.—On this mine they are actively at work with a shaft 10 ft deep, and the ore body continues to yield good ore, which seems to become richer the further they get from the surface.

COLORADO.

OLPIN COUNTY.—Georgetown Courier, Dec. 2: Central City shipped \$95,100 in gold bullion in October. Mr. Standley has let a contract for sinking the main shaft on the California mine, on Quartz hill, to a further depth of 200 ft. A splendid body of ore has been struck in the 800 east level of the New York and Colorado company's property on the Gregory lode. The business mining company has been formed for the purpose of working the Centennial lode in the Rutland district. The vein is situated in one of the best belts in the district.

LAKE COUNTY.—Mining operations have been resumed on the Chrysolite, Scooper mine, which went to smash under the administration of J. W. Bonta. It is now to be vigorously worked by Geo. Daly. The Dunkin mine is now shipping an average of 15 tons of ore per day. A strike is reported on the Silver Wave mine, near the base of Twin Lake creek, near Hunter's pass. The Silver Cord combination, located on Iron hill, is reported showing up very well. The Silver Wave continues in its shipments of rich ore. The Iron-Silver receipts for October were \$99,003.45, paying for 4,864 tons of ore. Expenses, \$54,194.50; profits, \$45,718.95; balance, cash on hand Nov. 1, \$164,311.97. The California mining company has cleared a dividend of \$24,000 for the shareholders, aggregating \$80,000, payable on the 15th day of December.

BOUTLER COUNTY.—Three tons and 1,384 lbs of ore from the Emancipation mine, at Sunshine, returned \$311.83. Daily discoveries of new mines are reported from the tellurium belt, Boulder county.

SUMMIT COUNTY.—The Ollagher lode, toward which a great deal of attention has been given for some time directed, is now reported to be showing up well, the new ore streak coming in at the bottom of the shaft appearing to possess great value. The Grand Goose lode will start up during the first of the week. The new camp at Battle mountain, in the Eagle river district, continues to improve, and promises to be one of the richest camps in Colorado. From Red Rock it is reported that the Herald mine, belonging to the Eagle River company, is being developed. The output from the Robinson mine has been large for the past few weeks. Ten tons of ore per day are taken from the Snow Bank. An important strike of galena and black sulphurates has been made on the Black Diamond. An important strike is reported in the Washington lode, located on Sheep mountain, midway between Robinson and Kokomo.

IDAHO.

ALTURA ITEMS.—Yankee Fork Herald, Nov. 27: John McDonald, John Wild and James Martin arrived here from Altura county last Tuesday. To the former we are indebted for the following items: The Ida Elmore mine, near Rocky Bar, is working, 12 men being employed by it. The vein is from 12 to 27 inches in width, and the ore that is being extracted is good. A depth of 220 ft has been obtained, and tunnels are being run east on it. When 100 tons are out crushing will commence. The Vishnu 100 tons are out crushing will commence. The Vishnu and Idaho have been worked under lease for the past year. They are looking well, and a New York company is negotiating for their purchase. At Atlanta things are moving about as usual. Twenty-six men are at work in the Monarch, and the ore taken out is good. The Buffalo is at work, and the company's mill is running right along. Only 15 men were in Atlanta hunting work when the gentlemen left. Last Sunday there was 2 1/2 ft of snow on the divide where the trail crosses the Saw Tooth mountains. At the Saw Tooth lake there was 6 inches. From the latter place to Bonanza no snow was encountered till within 10 miles of here, where there were 2 or 4 inches.

MONTANA.

BEUL.—Butte Miner, Nov. 30: The middle or whim shaft has attained a depth of 100 ft. The crosscut is all in ore, with streaks of rich and low grade ore. The west drift in the bottom of the whim shaft is being actively forwarded, and is stripping a fine body of silver copper ore extending all along the north side of the drift, which is now 210 ft long. Stopes will be started, and in all probability the level will be widened to the full width of the vein, which, besides being one of the richest, is also one of the largest and strongest in the camp. On the south vein, which is producing only free ore, operations are confined to the drift running west at a depth of 40 ft, and the face of which is 30 ft distant from the shaft. The product averages 30 ounces in silver and amounts to 15 tons daily. On the dump are about 250 tons of ore, 100 tons having recently been shipped to the Clipper mill. The Bell employs about 30 men, and the total daily product of the mine is about 25 tons.

MAESA CHARTER.—The ore body in the north drift has been penetrated for a distance of ft without striking the hanging wall. At this point in the explorations, a break in the machinery occurred which necessitated the closing down of the mine until the damage can be repaired. The ore so far opened up is of average quality.

STEVENS.—Operations have been resumed in the middle shaft. The face of the 60-ft west drift is in 120 ft and shows up a 2-ft body of quartz, rich, compact and clean, and lying between well defined walls. A considerable amount of first-class ore is on the dump, from which several shipments have been made to the Dexter mill.

ACQUISITION.—Considerable activity prevails in the development of this property. The stopes on the 70 level continue daily to produce about 8 tons of exceptionally high grade ore, and, as yet, scarcely a visible impression has been made on the vein. Steady shipments are being made to the Colorado smelter.

COLUSA.—The face of the east drift, which is about 340 ft from the old shaft and 100 ft deep, is being driven ahead on a fine body of copper ore, some of which is exceedingly rich.

OPHIR.—Mr. Allen is meeting with excellent success in opening up this prospect, which is rapidly developing into an splendid proposition. On the 20th of November the vein at a depth of 40 ft was found to be unmistakably dipping towards the south ledge, and at a considerable angle with the surface, it has been deemed advisable to start a new shaft on the latter. This was begun about a week ago, the ore at the surface assaying \$32.

ANSELMO.—The sinking of No. 2 shaft has been resumed from the 70 level. The new whim works well, and with it will be sunk to a depth of 250 ft by the 1st of March next.

NEW MEXICO.

ENCOURAGING.—Herald and Sentinel, Nov. 30: In the various mining districts adjacent to Silver City, new locations are made every day. The present outlook is such that encouragement meets us on every side. In Chloride Flat sinking lower and drifting in the slate formation shows the native silver between the layers of the slate, and chloride of silver still shows in fair quantities. The Bremen mines and mill are running night and day on fair ore from the Silver Flat district. One of the formations of slate appears cropping out between the lime and granite, and on claims where shafts have been sunk born and native silver have been found in fair quantities.

IN THE BURRO MOUNTAIN DISTRICT the copper locations are showing better and better every day. During the past week parties have been out examining the different claims in and about Cherry creek, and report good indications, when any work has been done, that the ore running is very good per cent copper. This district, although comparatively new, is being prospected quite thoroughly, and the results give great encouragement.

AT PINOS ALTOS development is being pushed on the various gold claims in and about Bear creek; also on other claims, showing a very good ore, containing both silver and gold.

AT SAN RITA the copper mines are being resumed, and work is being done on new prospect holes with astonishing results. In this same district other copper locations are being prospected, and from appearances, as the work progresses, this locality bids fair to stand ahead of any other in the United States.

AT OROBERTOWN the Mimbres Reduction Works have not commenced operations with their new mill, but expect to do so in a few weeks. The different mines in this locality are now being worked, and assayers are on the dumps separating and getting ready for the mill when it starts up.

This month has shown a large increase in locations in all districts over any previous month, and with the great increase of miners from other localities, the work of prospecting is going forward rapidly.

OREGON.

MINING NOTES.—Democratic Times: A great deal of mining will be done this winter, if water ever comes. The miners of Josephine county are making preparations for a bigger run than ever this winter. The miners are busy at work making preparations for winter, and will be better than ever prepared for any amount of wet weather. Bardell & Kline are unable to work their quartz ledge on account of water. They propose putting up a pump next season, and will then prospect it thoroughly. A rich strike has occurred in the Siskiyou ledge, on Humburg creek, a candle box of rock yielding \$500. Orizley Gulch ledge, on Indian creek, richer still. Eagan, located in Siskiyou county, Cal. T. L. Beck, the enterprising Willow Springs miner, desiring to work the ground now taken up by the county road in a portion of that district, is now building a new road in lieu thereof, which will be a better one than the other. He is making preparations for an extensive run of this mine, and has secured an extension of the Schumpert ledge in the Willow Springs district, has disposed of a fourth interest to Ralph S. Smith, of San Francisco, for \$100, and will immediately commence prospecting it. He proposes running a tunnel first should the ledge prove valuable. California capital will be invested in it.

POCAHONTAS NOTES.—Bedford Democrat, Dec. 5: The cold weather has closed out mining operations in this district unless it is the eternal Chinaman with his inevitable rocker. The new proprietor of the Camp Carson mine proposes that the trade from that section shall come to Powder River valley, and to that end has had several men at work on a road from that point to this for some time. S. B. Bailey is enlarging his mining ditch to a capacity of 1,200 inches.

THE Barbee & Walker Mining Co., of Utah, paid a dividend of \$10,000 at New York on the 27th ultimo.

The United States Geological Survey.

Clarence King, Director of the United States Geological Survey, has completed his first annual report to the Secretary of the Interior. It outlines the organization, numerous fields of work, the present plans of this newly-established Bureau, embodies the preliminary reports of various staff officers now engaged in active operations, and forebodes the compilation, during the coming winter, of no less than 12 volumes of practical and general geology, etc., as the results of the work already accomplished during the one and a half first seasons which have elapsed since Congress provided for the organization of the survey.

Among these volumes will be an elaborately practical, as well as scientific, treatise upon the precious metals, by Clarence King; the geology and mining industry of Leadville, Colorado, by S. F. Emmons; the history of the Comstock lode, by Eliot Lord; the geology of the Comstock lode, by Geo. F. Becker; the mechanical appliances used in mining and milling on the Comstock lode, by W. R. Eckert; the geology of the Eureka mining district, Nevada, by Arnold Hague; lesser metals and general mineral resources, by Rothall Pumpelly.

"I have so arranged the initial work of the survey," says the report, "that special volumes on the most important geological subjects and mining industries in the four western divisions of the survey shall be brought to prompt publication. There can hardly be two opinions on the desirableness of immediately working out such problems in these great districts which, in their past and present history, offer examples of instructive geological structure and great bullion yield, and which have required of mining men special mechanical skill and a large outlay of capital. Proper scientific reports on such typical districts become records of remarkable phenomena in the fields of industrial geology, and chronicles of distinguished success in the department of mining engineering. Among the great numbers of mining districts which merit rigid investigation I have chosen three, which, more than others, seem to offer harvests of technical information, of which the mining population stands in immediate need: Leadville, the extraordinary district in the middle of Colorado; Eureka, Nev., which, for 15 years has been the most productive silver lead district in America; and the incomparable Comstock lode are chosen as the first three districts to be illustrated by special monograph."

Further on in this preliminary report the Director remarks that, although foremost among all nations in the production of precious metals, ranking first in resources of petroleum, coal and iron, and abundantly endowed with nearly every mineral substance demanded by the civilized arts and sciences, the United States has conspicuously failed to gather and publish systematic statistical knowledge of the yearly mineral productions. He adds: "It is estimated that the mere raw products of the mineral industries do not fall far short of four hundred millions of dollars annually, and it requires no gift of extraordinary foresight to reach the conclusion that a few years will bring the yield to a thousand millions. Until congress extends the field of geological survey over the region east of the 100th meridian, this Bureau will confine its own operations in the department of Mineral Statistics to the industries of the far West."

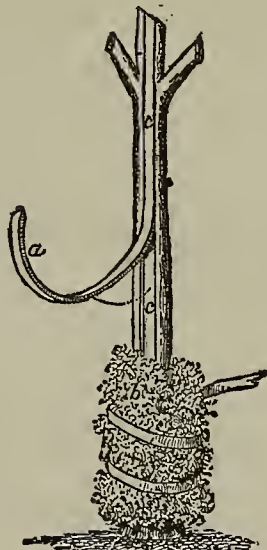
He says an appropriation of \$50,000 per year will be sufficient to carry on all the work that is desirable over the whole United States, and submits that so small an appropriation as this would not be an excessive contribution toward the development of so vast a field of American enterprise.

THE GUADALUPE SALE.—The property of the Santa Clara mining association of Baltimore, was sold by the Sheriff, at San Jose, on Tuesday, to satisfy judgments of the Santa Clara Valley mill and lumber Co. and the Bank of California. Before the sale a protest was entered on behalf of the San Francisco creditors, whose claims amount to about \$40,000. The judgment of the Bank of California is for \$134,000 and that of the mill and lumber company for \$5,100. But few persons were present except those immediately interested. On the property first put up there was but one bid, that of the Bank of California, the offer being \$37,157.92, at which it was struck off. The adjoining property was then sold on behalf of the lumber company, B. P. Rankin being the purchaser for \$5,100. This property is the famous Guadalupe mine. Mr. B. B. Thayer, the superintendent, worked it up into a first-class mine. All the works, buildings etc., were of the best character. It was closed down last June, but will probably be worked again when legal difficulties are over.

THE INDIAN CENSUS.—A Washington dispatch says: The attempt to take the Indian census by the patriarchal plan met with great obstacles. Special agents notified census officials that, owing to the Indians scattering and their superstitious reluctance to give the names of themselves and families, they have been unable to make any headway yet among the savage tribes, and must have more men and money. Secretary Schurz directed the Indian agents to assist in the matter, but they do not seem to have obeyed very effectively. It is not expected to have any reports in this year, and it appears the attempt to take families by name will have to be abandoned.

Harvesting Cinchona Bark.

Concluding the subject of cinchona culture, which we began Nov. 20th, we give below an engraving to show one of the methods by which the bark is obtained without destroying the tree. In South America, barks of all sorts and ages are collected indiscriminately, and in such a way as to kill the trees; such a system was evidently inadmissible in the case of cultivators. One of the improved plans is known as "mossing," and is illustrated herewith. Two parallel cuts, *c*, are drawn down the stem, the strip of bark, *a*, included between them is then raised from the incisions, and pulled off carefully from the bottom upwards, great care being taken not to injure the *cambium*, or sappy matter, left in the hollow; immediately the bark is removed, a thick coating of moss, *b*, is honed around the wounded stem. By this process, the *cambium* granulates, and forms a new bark. It is essential to observe that the moss is free from lichens. The strips of bark removed are about 1 to 1½ inches wide; such a number are taken as the tree will afford, leaving intermediate strips of somewhat greater width. At the end of 6 to 12 months, the bands left in the first instance are taken in the same way; in 12 to 22 months, the parts first stripped will be covered with new bark ready for re-stripping. The advantages claimed for this plan are that a crop of bark equal to half the total trunk-bark of the tree can be taken annually, without damage to the tree; and that this bark is richer in total alkaloids, and especially in crystallizable quinine, than natural bark. It appears, however, that this increase of total alkaloids is not observable in the renewed bark of trees at the maximum yield (over 3 years); but the proportion of quinine is augmented, and the value of the bark as a source of pure quinine is there-



"Mossing" the Cinchona.

by raised. The enrichment of the renewed bark is said to be at the expense of the bark outside the mossed region; and it is said that renewal is prevented, or much retarded, by the least injury to the *cambium*. Further, the cropping cannot be depended upon often more than once in 2 to 3 years; and this rapid cropping tends to shorten the lives of the trees. Finally, the operation can only be performed when the air is quite moist, and therefore at a time when the bark can least easily be dried. In some instances, too, the plan has been frustrated by the renewing bark being devoured by ants, who found an asylum in the moss. On the other hand, a number of trees which were left bare (unmossed) after the harking, renewed their bark fairly well. When sufficient supplies of moss cannot be procured, as for instance in Coorg, a substitute is found in detached leaf stalks of the plantain, and the leaves of wild cardamom, or of ginger. These should be applied in a dry state, and not with a smearing of clay, as has sometimes been done.

Mining Dividends.—The following local mining incorporations declared dividends last month:

Deadwood Mining Company, 25 cents per share.....	\$ 25,000
Eureka Con. Mining Co., 50 cents per share.....	25,000
Golden Tyra, 25 cents per share.....	25,000
Homestake Mining Co., 30 cents per share.....	30,000
Homestake (extra div), 30 cents share.....	30,000
Idaho Mining Co., \$5 per share.....	15,000
North Bloomfield Gravel Co., \$1 per share.....	45,000
New York Hill Mining Co., 20 cents per share.....	10,000
Northern Belle Mining Co., 50 cents per share.....	25,000
Ontario Mining Co., 50 cents per share.....	50,000
Silver King Mining Co., 25 cents per share.....	25,000
Standard Con. Mining Co., 75 cents per share.....	75,000
Western Mining Co., 75 cents per share.....	75,000
Watt Blue Gravel Mining Co., 7 cents per share.....	7,000
Total.....	\$425,000

Of the above, the Watt Blue gravel makes its first appearance on the dividend list. The North Bloomfield has not paid a dividend for a long time, though this is the sixteenth one of the company.

Eureka District.

Outside of two mines in Eureka district, says the *Sentinel*, the thought often recurs to the practical miner—who is acquainted with the history of the camp—as to where a test has been made of the value and extent of the ore channels from whence is to come our future wealth and prosperity. Where has a trial been made by which we can approximate the worth or permanence of any portion of the district? The magnificent results of mining, so far, in the output of precious metals which has made the name of Eureka mining district famous, has only been done through the developing of our innumerable prospects. In numberless cases we could cite where owners have made several thousands, they have spent it, being generally of that class of frontiersmen who believe in getting their "money's worth" of such enjoyments as offer. The consequence was, that when the pinch in the ore vein was encountered, these owners were flat on their backs financially, and the good fortune which they had met with had unfitted them for the steady perseverance which had attended their first endeavors. Take, for instance, the Geddes & Bertrand. To the owners it was merely a summer's work to make hundreds of thousands in bullion, transfer it to coin in the fall, and spend the winter in riotous living, either in San Francisco, or New York. At last there was a "faunt" in the body or crevice, and a summer's work left the proprietors in debt. That was out of the programme, and there the mine lays. The Geddes & Bertrand is but one in a hundred we could mention in this district.

What we need is heavy machinery, deep shafts, long drifts, and the working of many diamond drills, and Virginia City in her palmy days, could not boast of more wealth and more prosperous times than could Eureka.

It requires corporate bodies with heavy capital to prospect this section as it should be, and till schemes are under consideration to sink, in various portions of the hill, deep shafts, or bore to test the formations which underlie the shallow workings of the present day, we may expect no boom, though we may hold our own for several years to come. The test will come in due time, and will be prosecuted to a definite result. At present the real knowledge concerning our mineral deposits is limited. And it is equally as well understood that those mines which have been developed have to-day unknown and unprecipitated large bodies of high-grade ore at hand and ready to break down. This knowledge of the developed properties makes the question of our future of more than passing importance.

No district offers so important inducements for large enterprises. It has been proven, no temporary field for limited operations.

Some time ago we noticed in a mining review, that the suggestion of co-operation was advanced in camps where capital had not become interested, and among our many mine owners, we cannot see where harm would follow for them to adopt the same. One mowder cuts hay for several ranches in Huntington valley; the machinery on one mine could be utilized in developing half a dozen adjoining properties, rather than he idle because of the ore body having pinched out in the "feet" which belong to the mill and mining company. Large schemes of co-operation, and a gradual tendency toward mutual assistance, would produce the most favorable results, on small capital, if applied to the mining interests of this district.

We know the foundation upon which our people stand, and what we are to work for. It is no "promise" of reward for those who expend money and labor.

One great drawback to this district has been the expensive treatment of ores. We now have competition, and will soon have more. But in the main, though our ore is rich and is often found in large quantities, still the cost of extracting, of transportation, of charcoal and its transportation, the shipping of the bullion, all this and all that, tells heavily, even on the best of mines. The reason why capitalists are easy to become interested in New Mexico, Colorado and Arizona at the present time, is because they have good mines there; the Eastern people have flooded the country, and labor is cheap; charcoal can be had in abundance for from 8 to 12 cents per bushel; the *greases* raise, almost without labor, any quantity of vegetables and everything is cheap, while their silver production, even though less, is of as "good quality," as ours.

Thus it appears that we of Eureka district must arise and unite for active work; either offer remarkable inducements to outside capital, or concentrate to prove our richness in the deep workings of at least some properties other than those which are known the world over.

NEVADA'S POPULATION.—Jackson Ferguson, Supervisor of the census for Nevada, has completed the returns, though the official figures have not yet been published. He states that the total population of Nevada is within a hundred or two of 60,000, showing a gain over the last census. Instead of losing, Storey county has gained, its present population being between 16,000 and 17,000 an increase of 4,500.

The Calumet and Hecla copper mine of Michigan has produced 16,233 tons copper during the first 10 months of the year. This is within 96 tons of the total product for the whole of the year 1879.

Hats from the California Fan Palm.

Mrs. N. W. Winton, Secretary of the Santa Barbara Horticultural Society, has sent us some samples of hat-braiding, the material being derived from the leaves of the California fan palm (*Washingtonia filifera*), which grows wild on the Mohave desert, and has been introduced as an ornamental plant in gardens all over the State. The utilization of the leaves of this plant as a fiber for braiding seems to have originated with Mrs. Joseph Sexton, of Goleta. Santa Barbara county, and the specimens of her work sent us by Mrs. Winton are quite handsome, and show the strength and beauty of the material employed. Mrs. Winton has prepared for the Santa Barbara Press, an account of the way such fibers are prepared for braiding, illustrating the practice of the Panama straw braiders, who use a different kind of plant (*Carludovica palmata*), but which has a leaf similar to that of a palm. The leaves are gathered before they unfold, as in the case of our palm, and in preparation the ribs and coarser veins are removed, then the leaf is cut in shreds. It is said that in New England large quantities of this palm are imported and worked up at the homes, with profit, despite the distance the material is brought; and it is at this point that their mode of stripping comes in for our aid. Their method is to prepare a board, with a row of sharp knives on the edge, and drawing the palm over this strips it into uniform shreds. These strips for the Panama hats are exposed to the sun for a day, and then tied into a knot and immersed in boiling water. This process whitens them, and after drying in the shade they are bleached for several days with sulphur. These preliminary processes are carried on at headquarters, and then distributed to the natives for braiding, which is done on a block of wood held firmly on the lap.

The palm fiber exceeds in durability any known article—it will not break, but only wear out in process of time, and Mrs. Winton rightly concludes that they will always be at a premium with mothers, one of the unsolved problems of whose life is, to keep whole hats on a family of irrepressible boys. One of the essential elements of the happiness of a boy's existence will be destroyed if he cannot manage a ventilator or two in his painfully new straw hat. A palm fiber hat is warranted to stand service as hat for a ball; a basket for eggs, fruit and rocks, and any modern convenience desirable for the masculine juvenile.

Mrs. Winton also mentions the manufacture of fans from the leaves of our fan palms. For fans, several of the *Chameroops* *C. humilis*, *C. palmata*, *C. excelsa*, etc., are used. These are prepared by trimming and bleaching, wiring and binding; and grow freely here. Mrs. Winton saw them in South Carolina forests, and was informed that they were cut and sent North for all the work upon them; an example unworthy of our imitation. No country can prosper without a multitude of small interests as well as large. About two leaves per month can be cut from one plant. The California fan palm grows well in nearly all parts of the State, even as far north as the snow line. Those who have the plants may be interested in home experiments in braiding the fibers.—*Rural Press*.

POPULATION OF ALASKA.—The enumerator who was sent out last May to take the census of Alaska has returned to Washington. He traveled to Alton, the extreme western point of the Aleutian islands, northward to Norton sound, up the Yukon river, 900 miles overland and by canoe to Kodiak, getting all the population west of Sitka and north of Prince William's sound. The population of the southeastern portion of Alaska was to be taken by a deputy, who has not yet reported. The population of Alaska, as far as reported, aggregates about 22,000, of which about 18,000 are Indians, 1,300 Aleuts, 1,500 Creoles, or mixed Russian and Aleut, 128 white males and 4 white females. The largest population in any one center is at Kodiak and the adjacent island, where there are about 2,200 persons, principally Indians, Aleuts and Creoles, with a few whites. In addition to the above population in Alaska, Captain Smith, ice pilot of the revenue steamer, *Corwin*, counted 2,200 Esquimaux between Behring strait and Point Barrow. It is estimated that Alaska contains about 30,000 human beings, of which, possibly, 300 are whites.

An old idea in a somewhat new form has turned up at Kiel, Germany, where a trial was made recently with a so called "hydro-motor ship," built after the plans of Dr. Fleischer, of Leipzig. The vessel, which is 17 ft. beam, 110 ft. long, 5½ ft. draft and 100 tons burden, made 10 knots an hour. She is propelled by the force of hydraulic reaction, without the aid of either paddles or screw. The water passes into a reservoir in the hold through holes in the bottom, and is thence pumped out and emptied into the sea by a centrifugal pump worked by the ship's engine, the discharge of water propelling the vessel. The engine discharged 5,000 gallons per minute, and is said to have furnished a stronger propelling power than screw or paddle, while the motion was without jar and as gentle as sailing. The ship could be stopped, backed or turned instantly, so as to be free from all danger of collision. Indeed, a vessel thus propelled, it is stated, can be made to revolve in a circle about its own axis.

THE ENGINEER.

Progress of Engineering in America.

Until the close of the last century, natural power had over been employed in its most primitive forms. Wind and water were the only motive powers called in to aid man in his labors; and the appliances to utilize them were of the simplest possible character. It is true, some great engineering works were undertaken and completed; but only at large expenditure of mere labor and muscle. But with the introduction of steam, in 1778, a new wide field was opened up for the exercise of the genius of the engineer and mechanic. The invention of Watts was a triumph which set men to thinking, and its successful application contributed more to the prosperity and welfare of nations, and the advancement of science and mechanism, in the next succeeding century, than had been achieved by the united efforts of all previous time. Perhaps in no part of the world has it given birth to greater activity, or accomplished greater triumphs, than in the United States.

At a late meeting of civil engineers in St. Louis, a very interesting paper was read by Mr. O. Chanute, summarizing the progress and wonderful growth which engineering has made in this country, and alluding to the high position which the United States has attained among nations. From this paper we briefly summarize as follows: In the matter of supplying towns with water, the application of steam as a power, and the improvements made in pumping machines, engineers have made a gain of 50% over what was accomplished 20 years ago. There are now 569 towns and cities in the United States and Canada supplied with water works, involving 13,000 miles of pipe, 10,000 of which is of cast iron. Important progress has also been made in canal engineering; and we now have 3,257 miles of canal.

Experiments are in progress in the way of steam propulsion, which it is confidently expected will effect a saving of fully 37% over present methods. In railways, Americans were among the first to appreciate Stephenson's inventions of 1828, and are foremost among nations in utilizing it. The United States leads the world in the extent of her lines, reaching 86,000 miles; all Europe has but 90,000, and the balance of the world only 25,000. Our railroad engineers and locomotive builders lead all others. Our roads reach farther and cost less than any others, and our engines pull heavier trains and run more miles in a year, or during their lifetime, than those of any other nation. The Pennsylvania railroad was pronounced one of the best, if not the best, managed railroad in the world. [The present writer would name the Baltimore and Ohio as the only road whose management can be pronounced either equal or superior to that of the Pennsylvania.] In regard to bridges, there are now in the United States 900 miles of these structures—one-third of them stone or iron, and two-thirds wood. [The East river bridge, at New York, may be instanced as the holdest conception of bridge construction ever attempted.] The matter of river improvements is just now attracting much attention, and the fact is being realized that, until quite recently, but little has really been done in this direction. It has been demonstrated that the currents of the largest rivers may be controlled by simple brush dikes. The movable dam on the Ohio—a French idea—has already proved a success, and the best engineering talent in the country is now engaged in effecting certain needed modifications required to meet the peculiar nature and needs of our rivers. The recent improvements to navigation at Hell Gate and Flood Rock were referred to as great and novel feats of engineering. In telegraphic and gas engineering, we have made wonderful strides. In the former, we lead the world; in the latter, since 1850, the number of companies has increased from 50 to 900, with a capital of \$200,000,000. In metallurgy, the increase of our blast furnaces is especially notable. In the amount of iron produced, we are next to England, Germany standing third. Our steel industry, which is now second only to that of Great Britain, will exceed that country in another year. Our increase has been 50% in two years. Our mining industry, especially in regard to the precious metals, is simply enormous. The petroleum industry was briefly alluded to. Our exports of that product are now the fifth on the list in point of value. In agricultural engineering, our progress has been truly wonderful, and hence this all other branches become as dust in the valley. In the plow alone the annual saving of labor in producing our crops amounts to fully \$36,000,000 less than the same work would have cost 30 years ago. It is in ship-building and maritime trade alone that we have lost ground during the last two decades. This decadence is attributed to the war of rebellion, and to unequal competition with England in ship-building, and the superiority of iron over wood—an industry to which our engineers and capitalists have not given proper attention; but it was confidently predicted that in the early future we shall once more assume our proper place on the ocean.—*Californian*.

THE medicinal rule is that an elevation of 4,000 ft. above the level of the sea confers immunity from yellow fever.

USEFUL INFORMATION.

POLISHING AND FINISHING METALS.—The following directions, which will frequently be found useful for finishing and polishing steel and iron, are given by *Forge and Lather*: To get the beautiful finish we see on the best work, a piece of flour emery paper, well worn and a little oil upon it, will be found the best thing to use, and when this has been well worked to get the high polish, a piece of wood flat upon the surface, with some fine crocus will bring it up to this state; and if any deep scratches be there you will at once observe them, and to remove them, in all probability it will have to be filed over again. The scratches must be removed before any attempt is made to polish. There are several ways of ornamenting the work if you do not wish it to be left straight. First, then, to cross the surface. This is done by folding a piece of emery paper tightly round a file, taking a kind of circular action, by doing which each line becomes, so to speak, connected. Another process of finishing steel is to curl all over the surface with a piece of oilstone that will cut. This is a most difficult thing to obtain, as few stones cut without leaving bright marks. Hold it firmly in the hand, moving it about in all directions like curling brass. There is no stated number or size of the curl. Another way of finishing iron and steel is with the scraper, which is used with both hands, and the work must be scraped in various directions, but with regularity.

COMPRESSING FLUID STEEL.—A proposal has lately been made to effect the compression of fluid steel, by placing in the ingot mold on the top of the fluid metal a charge of soda or other solid which evolves gas on being heated; the top of the ingot mold being then closed, and the pressure due to the gas generated being allowed to act on the fluid steel. This mode of operating was first started by M. Antoine Galy-Cazalet, of Paris, some 13 years ago, who proposed to use a mixture of 80 parts of soda with 20 parts of charcoal, the mixture being introduced through a cock fitted to a cap affixed to the head of the ingot mold. With a space of 30 cubic inches capacity between the fluid metal and the ingot mold cap, the introduction of $\frac{1}{2}$ oz. of the mixture is stated to give a pressure equal to that of a head of metal 90 ft. high.

TO KEEP LAMP CHIMNEYS FROM CRACKING. The following recipe for keeping lamp chimneys from cracking is taken from the *Diamond*, a Leipzig journal devoted to the glass interest: Place your tumblers, chimneys or vessels, which you desire to keep from cracking in a pot filled with cold water, add a little cooking salt, allow the mixture to boil well over a fire, and then cool slowly. Glass treated in this way is said not to crack even if exposed to very sudden changes of temperature. Chimneys are said to become very durable by this process, which may also be extended to crockery, stoneware, porcelain, etc. The process is simply one of annealing, and the slower the process, especially the cooling portion of it, the more effective will be the work.

BORAX TO PREVENT MILDEW.—We understand that experiments lately made by Whewell, of Blackburn, on the employment of borax for preventing mildew in cotton goods, show that it cannot be employed with flour paste, as it turns the paste yellow. It can be used with advantage with farina, as it does not color the paste, and also increases its tenacity. A six per cent solution can be employed, which, at the present price of borax, namely £65 per ton, is equal to about £4 per ton.—*Textile Manufacturer*.

HUMAN POWER.—At a late national trial of hand fire engines, Prof. Hartig made some experiments on human power for short intervals. The engines were worked by foot soldiers, on a warm day, and under an exposure to the direct rays of the sun. The mean velocity of the handles was 5.81 ft. per second; the mean value of the effective work for each man, 163.32 ft.-lbs. per second; or about 4.1 times the value which Morin and Weisbach assumed for the average of eight hours continuous labor.

A DRY coating for basement walls may be made as follows: Take 50 lbs. of pitch, 30 lbs. of resin, 6 lbs. of English red and 12 lbs. of brick-dust. Boil these ingredients, mix them and stir thoroughly, then add about one-fourth the volume of oil of turpentine, or enough to make it flow easily, so that a thin coating may be laid on with a whitewash or paint brush. Walls thus coated are proof against dampness.

CATHEDRAL CARVING.—It is said that the fine and various carving into which old cathedrals blossom at every corner, where a piece of fantastic ornament could find a foothold, is partly due to the interest which the workmen took in their labor. They carried home stones, and in their leisure hours wrought out whatever design seemed best to them. It thus became a labor of love.

AMERICAN cotton helting is now, it appears, obtaining more appreciation in England. Mr. Kirkaldy, the well-known expert, has made some tests recently, and has found that a 3½-inch cotton belt broke under a load of 4,187 lbs., while an English leather belt 4 inches wide was broken at 2,000 lbs.

WHY A PUMP WILL NOT LIFT HOT WATER.—The suction pump depends for its action on atmospheric pressure. When the piston of such a pump is raised, a vacuum is formed beneath it, and the water from the well or reservoir is forced to follow the piston up to the top of its stroke, by the atmospheric pressure on the water surface with which the pump is connected. When the attempt is made to lift very hot water, however, the rise of the piston causes an abundant evolution of steam or vapor from the water surface, which fills the space beneath the piston. This steam or vapor has considerable tension, and exerts a sufficient back pressure to counterbalance and equalize the atmospheric pressure. On this account, the lifting of hot water, save for very small lifts, is impossible. When hot liquids are to be pumped, therefore, the point of supply should not be below the pump, but rather a little above it, so that the liquid may flow into it.

FOR DOG'S DISTEMPER AND FITS.—The best and most positive cure is said to be as follows: Give the dog one ounce of syrup of huckthorn, just one week after give him another ounce, and one week after the second, give him the third ounce, and he will be cured. For fits the best thing to give is gunpowder and milk, well mixed, given to the dog two or three days in succession; from two to four tablespoonfuls each day, or until he is thoroughly physicked; an over-dose will not hurt him. The cause of fits is feeding too much meat and too little exercise.

TO MAKE CORKS AIR-TIGHT AND WATER-TIGHT.—A German chemical journal commends the use of paraffine as the best method of making porous corks gas and water tight. Allow the corks to remain for about five minutes beneath the surface of melted paraffine in a suitable vessel, the corks being held down by a perforated lid, wire screen or similar device. Corks thus prepared can be easily cut and bored, have a perfectly smooth exterior, may be introduced and removed from the neck of a flask with ease and make an absolutely perfect seal.

SOLID MUCILAGE.—Mucilage in a convenient, solid form, and which will readily dissolve in water, for fastening paper, prints, etc., may be made as follows: Boil one lb. of the best white glue, and strain very clear; boil, also, four oz. of isinglass, and mix the two together; place them in a water bath—a glue pot will do—with $\frac{1}{2}$ lb. of white sugar, and evaporate till the liquid is quite thick, when it is to be poured into mold, dried, and cut into pieces of convenient size.

GOOD HEALTH.

Cure for Whooping Cough.

A correspondent of the New York *Sun* writes as follows from actual experience and from observation:

It is well known to most intelligent people that exposure of patients to the vapors arising from the purifying boxes in the gas works almost invariably relieves the terrible paroxysms, and, after repeated visits cures have been frequently effected. This discovery was made by a physician of Paris, about 15 years ago.

The fact was published, and soon after visits began to be made to the Manhattan, New York, Brooklyn, and other gas works on the recommendation of our medical men. An epidemic of whooping cough raged in Newport in the winter of 1878. Over 200 patients, between the ages of two months and 75 years, visited the gas works. The Treasurer of the company, William A. Stedman Esq., states that nearly all were benefited, and some were undoubtedly cured.

About that time the child of a distinguished chemist in Providence, R. I., was seriously ill with this terrible disease, and too weak to be taken to the gas works. The father procured a quantity of the liquid hydro-carbon deposited by condensation in the bottom of the purifying box, and vaporized it in a metal dish in the closed room of the little sufferer. Almost immediately it revived, and spasms were checked and after a few days the child recovered and was as well as ever.

Microscopists have recently discovered that the cause of whooping cough (pertussis), is the rapid aggregation of bacteria under the root of the tongue. These must be destroyed before relief can be obtained. To this end such powerful medicine as quinine bromide is given; but even that fails to reach the seat of the disease. Of course the ordinary expectorants are absolutely useless; change of air is rarely curative; hence the rapidly increasing percentage of deaths from this disease.

The New York Board of Health report for 1875 has a list of 489 deaths from whooping cough in that city. The deaths weekly in London, England, are from a minimum of 60 to a maximum of 220, over 6,000 annually.

Physicians generally inform the anxious parents that whooping cough must take its course, as a remedy is unknown, and they can only slightly relieve it; that the incubation and increase in virulence will occupy six weeks, and from six weeks to six months will be required before it is entirely removed. The whoopings usually increase regularly in number from day to day to the fifth week, often equalling 40 times in 24 hours. Very rarely is this disease

preceded by any other, but so great is the strain upon the system that frequently it is followed by pneumonia, in which event death often ensues. A fatal termination is more generally the result of absolute physical exhaustion due to the great strain consequent upon the oft-recurring paroxysms.

A few years since my youngest child, never before ill, was stricken by this dread disease. The best medical talent was obtained, every known remedy tried, most watchful care constantly exercised, but without the slightest avail. The child actually coughed itself to death. With all the grief of this sad experience still fresh, in April, 1879, we were alarmed by a new incursion of the destroyer. Our children, five and seven years, were attacked, seemingly with the severity of the preceding case.

It was then I learned of this Providence chemist's discovery, and that simple but ingenious apparatus had been invented by which the hydro-carbon, (by analysis found to be cresole $C_6H_5CH_3O$) could be evaporated in a closed room. I immediately procured both. The apparatus is a metal stand six inches high, supporting a cap, holding half an ounce of cresole. The heat is applied either by a petroleum night-lamp or gas, vaporizers being made to attach to an ordinary gas-burner.

Cresole is a rose-pink liquid, with a boiling point of 397 degrees. It is not unpleasant in odor, but, on the other hand, is extremely grateful to any one with the least bronchial or catarrhal affection.

In three minutes after the lamp was lighted the vapor of the cresole was diffused in every part of a room 15 by 20 ft. In ten minutes the children manifested evident relief, recovered from their dull exhaustion, and were playing on the bed, even laughing aloud in their evident freedom from the paroxysm.

I was not advised that it could be continued in safety all night, or even day or night, and at the expiration of fifteen minutes extinguished the lamp. The children had been whooping 20 times a day. One of them did not even cough for 12 hours, and the other for 36.

Learning that the vaporization could be continued day and night with more rapid benefit, I applied it for five nights in their sleeping-room. The spasms ceased and they speedily recovered.

At that time an epidemic of whooping cough was raging in my vicinity. I advised my neighbors of this apparatus. Many of them were used, and with the best results.

I believe the vaporizers and cresole are now to be obtained from druggists. I am confident it will be found equally efficient in all throat and lung diseases. Inhalation is the true mode of treatment. The apparatus is nearly perfect as an agent for deodorizing, disinfecting and perfuming not only the sick-room but an entire house. It deserves an extended trial.

ORIGIN OF DIPHTHERIA.—Diphtheria is believed to have originated in Egypt more than 2,000 years ago. It prevailed in Egypt and Asia Minor, to which it extended, during the first 500 years, and hence was early called Egyptian or Syriac disease. Having invaded Europe, the disease appeared in Rome, A. D. 330; and being akin to the plague, of which it may be a remote modification, having had the same origin, with some similar characteristics, and being like it and malignant typhus, highly contagious, the disease in its 1,500 year's transit on the continent of Europe, affected mainly rural districts and garrisoned towns. It had extended to Holland, in which it was epidemic, in 1337; to Paris in 1576, and appeared in 1771; having prevailed more extensively in France in 1818 and 1835, and in England and the United States from 1856 to 1860 and more or less since. In both city and country more cases have occurred, other things being equal, in warm autumnal and winter weather in damp localities, where the air is almost destitute of ozone, a powerful disinfectant, and being saturated with moisture is in a low or negative electrical condition of the nervous system, and correspondingly diminishing vitality, in those predisposed to the disease. Damp air also, doubtless, by diminishing the cutaneous exhalation, and otherwise, may increase the predisposition to this as well as other kindred diseases.

CHILDREN SMOKING TOBACCO.—The *Christian Union* points out the pernicious results of smoking by young persons. It says:

In one of the schools of Brooklyn a boy 13 years old, naturally very quick and bright, was found to be growing dull and fitful. His face was pale, and he had nervous twitchings. He was obliged to quit school. Inquiry showed that he had become a confirmed smoker of cigarettes. When asked why he did not give it up, he shed tears and said that he had often tried but could not. The growth of this habit is insidious, and its effects ruinous. The eyes, the brain, the nervous system, the memory, the power of application, are all impaired by it. "It is nothing but a cigarette" is really "It's nothing but poison." German and French physicians have recently protested against it. And a convention of Sunday and secular teachers was recently held in England to check it. It was presided over by an eminent surgeon of a Royal Eye Infirmary, who stated that many diseases of the eye were directly caused by it. Parents, save your children from this vice if possible! Do not allow them to deceive you. In future years they will rise up and hless you for restraining them.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, Dec. 11, 1880.

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Engine and Machine Works—W. H. Ohmen, S. F.
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The Week.

The rainy weather of the past week has been gladly welcomed. The prospects are that this year will be an unusually favorably one for hydraulic miners. The storms were late in beginning, but they have done good service so far. In the mountains the Nevada Transcript says an advantage for this season is that the snow now lies fully eight ft. deep on the water sheds of the reservoirs in the mountains, whereas the early part of last December it did not get more than a couple of ft. deep. Unless the weather becomes unusually cold, the miners will have all the water they can find use for till late next summer.

We notice that the Bodie papers are urging a consolidation of several mines so as to insure more economical working. This is but following out the principle tried on the Cumstock, and successfully, too.

The Comstock papers are also urging an "Eastward movement." They want a shaft started at the extreme north end which will do for it what the Forman shaft will do for the mines interested in it.

The week has been marked by the re-assembling of Congress. The President's message has been laid before the country, and it gives the fullest evidence of the reign of general prosperity at home and peace abroad. Indeed we live in a good land and in a good generation, and our alone is the blame if we do not advance, each according to the measure of his powers, in all good work and life.

THE promoters of the International Exhibition of Electricity in Paris next summer say that the voluntary subscriptions greatly exceed the 50,000 francs demanded by the State as a guarantee.

The Mouth Blowpipe.

It is probable that among the readers of the MINING AND SCIENTIFIC PRESS are many youths of an inquiring disposition, who, while having some leisure time on their hands, are more or less interested in matters pertaining to mining and metallurgy. To such the PRESS suggests the study and practice of the use of the mouth blowpipe, as a pleasant, cheap and highly profitable occupation for a portion of their spare time. Not only does the blowpipe afford an efficient and economical means of ascertaining the character and constituents of a vast number of mineral and of many organic substances, but it is also capable, in skillful hands, of being applied to the determination of the economic value of many metalliferous ores, fuels, etc., and that with a degree of accuracy which always surpasses those who are unacquainted with the subject.

It is true that many gentlemen who are perfectly qualified to write "assayer" after their names, as well as some who have no just title to append more than the first three letters of that designation to their patronymics, affect to deride the idea that the quantitative assay with the blowpipes can have any practical value; but in the opinion of the writer that only implies, either that they have not chosen to take this trouble to study the matter, or that they are disqualified by reason of some physical peculiarity affecting their delicacy of touch, or accuracy of vision, from carrying the operations to a successful issue.

Probably not a large number of our California youth will ever inscribe their names higher on the roll of scientific fame than have such men as Gahn, Harkort, Plattner, Berzelius, Rose and a score of others; yet all these great men attached a high value to the blowpipe as a means of making quantitative analyses, while several of them devoted a good deal of time to perfecting the methods of quantitative assaying with the same instrument. No one can even glance over the pages of Plattner's work on this subject, especially the later edition by Richter, without being amazed at the multitude of useful and interesting results attainable by means so apparently trivial.

It is true that a great many of the operations described in the work mentioned require a certain amount of aid from the use of liquid reagents, but not only does this fact not militate against the truth of the general proposition here affirmed, but even if we set entirely aside all consideration of liquid reagents, there still remains a vast and valuable field for study and experiment.

Not the least of the recommendations of the blowpipe laboratory is its comparative cheapness. With a blowpipe, a lamp or candle, half a dozen turned wood pill boxes filled with inexpensive materials, a knife and some pieces of charcoal, many useful and entertaining hours may be passed. These will not cost \$5. Add a short piece of platinum wire, a few glass tubes and watch glasses, a spirit lamp, a lens, a toy hammer, an ounce of nitric acid, and another of hydrochloric acid, costing only \$2 or \$3 more, and the field is enormously enlarged; and when we contemplate a complete set of Plattner's blowpipe apparatus, costing about \$125, we perceive before us an expanse of possibilities from which any ordinary intelligence may well recoil in dismay.

Another advantage of the blowpipe methods is, that they can be pursued with little or no instruction, other than such as may be derived from books; and the writer will promise any young man of ordinary intelligence, and having a clear, though slight, knowledge of the fundamental principles of chemistry, that if he will work faithfully and conscientiously through Richter's edition of Plattner's he will be a better practical and theoretical chemist at the end than nine-tenths of the students of chemistry who receive their instructions from university professors. Not, however, that such instruction is undervalued, but because that which is learned by the student's unaided exertions, and without even the semblance of coercion, is sure to be well learned.

There is yet another, though a minor advantage derivable from a course of practice in the manipulations of the blowpipe laboratory. It is that the student learns that perfectly satisfactory results can, in very many cases, be obtained from very small quantities of substances, even in quantitative determinations, but especially in those which are merely qualitative, so that he comes to avoid that reckless extravagance and waste which too often characterizes the use of reagents by students.

But many who are not competent, or who do not desire to push their attainments into the domain of pure science, may nevertheless acquire a knowledge of the directly useful and practical application of the blowpipe, in the discrimination of the commoner ores and minerals, and in the quantitative assay of ores of gold, silver, copper, lead, tin, iron, nickel, cobalt, etc.; and as an extensive apparatus is not needed for these purposes, while many young men are not in a position to procure it, the writer will, perhaps, in a future article, point out the means by which any reasonably ingenious and industrious youth may provide himself, at little cost, with all that is necessary. In the mean time, as the holidays are at hand, when it is usual for elders to testify their appreciation of talent and industry in youth, by means of presents, it may

be suggested that, in many cases, no more useful, appropriate, or acceptable gift could be offered to a young man, or a bright boy, than a copy of "Plattner on the Use of the Blowpipe," accompanied by such apparatus, of which there are many grades in the market, as is consistent with the pecuniary means of the giver.

Manufactures and Interest.

Just now the attention of the public is drawn prominently in the direction of home manufactures. California is not as prosperous as her sister States just at this moment, and we are beginning to think that we must establish manufacturing to work up our raw material. The question is, whether we can do this under the conditions existing here at present. Theorizing is all very well, and "general principle" statements sound nicely. But have we the men among us with the nerve to put their money into manufacturing and take it out of the old grooves where it earns interest without responsibility.

The truth of the matter is, that our California capitalists have, in the way of manufactures, done very little. They have never taken any risk. They let the poor man do that. In other countries, capitalists start up an establishment, put in their money honestly, and go to work. If this thing fails, they lose their money; but if it succeeds, they are gainers. They take ordinary business chances, of course.

With us it is different. A man or a few men want to start up a manufacturing establishment, and must rent premises or put up buildings, and buy machinery, and have some means to start in on. With the necessary knowledge of how to accomplish their object with the works prepared, they haven't the money to prepare them. They therefore go to the capitalist. He does not ask them how many men the project will give employment to, nor how much they can make per annum. He asks them what security they can give for the money. He doesn't propose to go into any manufacturing institution with his money. He wants, simply, to lend it. If they can give good security and pay good interest, all right; if not, they may say good-morning.

Now, there is more truth than poetry in this statement. Nearly every man who has started in at a manufacturing business here has had the same experience.

The consequence is, that the manufacturing establishments of California are fewer than they should be. The capitalists are more money lenders than anything else. Another result is, that what institutions there are in existence, are on a smaller scale than they should be. Persistent men go to work with a desire to build up a business, and those who can't give security must do the best they can, or give up the idea.

It is the poor man who takes the risk in all these transactions. He has got to run the works, take all the responsibilities and chances, and the risk of failure. The capitalist sits in his office and draws the interest. If it does not come promptly, he shuts down, and that is the end of the works. He loses nothing. It makes no difference to him.

Those who have had the temerity to go into manufacturing here have always had to fight their way against older established institutions East. They have had to overcome the absurd prejudice against home productions. They have had to pay higher wages than their competitors, and higher expenses also. But the worst fight they have had is with high interest. When they overcame all other obstacles, there stood the interest in the way. The man supposed to be their "hacker" and helper financially, is the man drawing the life blood from the institution in the shape of interest. He is the "Old Man of the Sea" on the shoulders of the business, hearing it down.

We must not expect to make any advance in manufacturing here until these conditions are changed. People ought to be satisfied to invest their money legitimately in an enterprise, and depend upon its profits. Unless our capitalists will do this, it will be extremely difficult for us to compete successfully with similar establishments East. Or perhaps some enterprising capitalists from the East will come here and go into manufacturing among us, as they are already coming and buying up our good mines, under the noses of our money-lending, interest-consuming capitalists. When they do, perhaps our monied men will come to their senses and start in to help the State in the way they should have done long ago.

MINING ACCIDENT.—While eight men were in the bottom of the Forman shaft, Gold Hill (Nev.), priming holes last Wednesday, one charge went off, and Charles Roberts, of Gold Hill, had both arms blown off and the top of his head. He leaves a wife and two children. John Date had one side of his head blown off. He leaves a wife in England. Chas. Josellini was standing on a plank a few feet above, and was badly wounded in the groin. He will recover. Several others were injured but not seriously.

The third dividend of the Evening Star mine at Leadville, Colorado, was paid at New York on the 24th ultimo. The amount was \$25,000.

Twenty-Four Page Holiday Extra of the "Mining and Scientific Press."

We propose, in Christmas week, to print an extra large edition of the MINING AND SCIENTIFIC PRESS. It will consist of 24 pages, and will be handsomely illustrated with new and appropriate engravings, which are now being prepared. This edition will be but an earnest of the endeavors we are making to have the PRESS of 1880 excel its predecessors in all important features.

Among the many articles of value for information and reference in our this TWENTY-FOUR page number, will be the following:

RAINFALL AND TEMPERATURE IN CALIFORNIA. With this article is a very elaborate and extensive table, showing the monthly and total rainfall and temperature from 1870 to 1880, at the following important cities and towns in California: San Francisco, Niles, Livermors, Stockton, Sacramento, Auburn, Cisco, Truckee, Marysville, Modesto, Red Bluff, Fairfield, Merced, Pataluma, Tulare, San Mateo, San Jose, Gilroy, Pajaro, Salinas, Soledad, Redding, Delano, Sumner, Los Angeles, Caliente, Mojave, Colton, Napa, Woodland, Williams, Oakland, Ione, Fresno, Anaheim, Santa Cruz and Martinez. Nothing as comprehensive as this on the subject has yet been published.

A large illustration with description of Dodge's New Shaking Table Concentrator, a machine now in operation here.

COPPER ORES.—Methods of sampling and assaying. How they are bought and sold. Classes of ore and price per unit.

LEAD FUMES.—Analyses of fumes of lead furnaces. Formation of fumes; results of condensation.

OUR GRAVEL MINES.—Condition of our hydraulic mining interests. Late improvements. Projected enterprises.

LEACHING OF ORES.—Results of leaching on this coast.

GOLD AND SILVER REFINING.—Showing the methods by which the various operations are performed at the New York assay offices.

OUR NORTHERN COAST TRADE.—With engraving of one of the class of steamers engaged therein.

INDUSTRIAL NOTES.—The latest news of interest in the industrial world.

PLUMAS COUNTY MINES.—A description of the mines of Plumas county and their present condition.

RICHMANN ROCK DRILL.—A description of a new drilling appliance now being introduced in our mines.

CHLORINATION WORKS.—Engraving and article describing the process and machinery for a new method of oblorinating gold ores.

YOSEMITE IN WINTER.—A handsome engraving, drawn and executed by first-class artists.

These are only a few of the articles being prepared for this extra 24-page edition of the PRESS.

The Rising Sun Mine.

The Rising Sun mine, near Colfax, is now making developments, that will, in a short time, prove profitable to its owners. The recent strike of the ledge in the eastern part of the mine, in the 100 level, completes a continuous ledge of good pay ore through the mine from the 1st to the 9th level. The history of the mine has demonstrated the fact that its richest part is toward the east. In the 300 east drift, which is 80 or 90 ft. further east than any other in the mine, we are informed that the ledge is quite large and exceedingly rich, and as progress is made further east, the ledge increases in size and the ore improves in quality. The formations in this drift is thought to indicate the existence of a large body of rich ore not far from the present workings, and work in this direction is being pushed forward with the greatest energy. The company have just paid a dividend in New York. The Rising Sun was located in the fall of 1863, and from 1867, the year in which the mill was erected, it has been a dividend-paying mine. During its existence it has yielded bullion to the value of nearly \$2,000,000. There are now about 1,200 cords of wood in the yard for the winter supply, all paid for. The mill is kept running constantly day and night, and everything indicates a continuance of the company's success.

Arctic Exploration.

The Cruise of the "Jeannette" Discussed by the Academy of Sciences.

At the meeting of the California Academy of Sciences a very interesting discussion took place concerning the *Jeannette* expedition to the Arctic. A very large audience was present, including Capt. Hooper, of the revenue cutter, *Corwin*, and his officers; Mr. W. H. Dall and Mr. Baker, of the U. S. Coast Survey, and several whaling captains, all of whom had been in the Arctic this summer. Among the audience were a number of persons interested in Alaska and others to whom the subject of Arctic exploration generally is of interest. The proceedings were opened by Mr. Chas. Wolcott Brooks, who read a very elaborate paper on the subject of Arctic exploration. He had gathered the main facts regarding the conditions in the Arctic this year from conversations with the whaling captains, and by examination of their logs.

Last Seen of the "Jeannette."

After coaling at St. Michaels, the *Jeannette* passed through Bebring's straits, made a stop at Cape Seroso on the northern coast of Siberia to leave letters, from which point he evidently steered direct for the southeasterly point of Herald island, near which he was seen, Sept. 2d, by Capt. Bernes, of the whaler, *Sea Breeze*. The next day the smoke from his smoke-stack was seen by several other whalers, who were to the northward of the *Sea Breeze*. He was still standing northward. This was the last that has been seen or heard of the *Jeannette*. Mr. Brooks then proceeded to present such information as he had been able to gather from the log books of whalers in regard to ice-flows, winds, etc., from which it appears that the time of Capt. De Long's arrival in the Arctic was peculiarly fortunate, as he undoubtedly found an open passage between ice barriers along the eastern point of Herald island, and thence along and near the east coast of Wrangell Land for 200 or 300 miles. The wharft at the whaling ground below Herald island was such as indicated a most favorable opportunity for the *Jeannette* to make her way north. The whaling fleet did not leave the vicinity of Herald island until about the middle of October—some six weeks after the *Jeannette* passed up and through the fleet, but not near enough to any ship to have communication. When the fleet left the

Two Missing Whalers, The *Vigilant* and *Mount Wollaston* which were considerably to the northward of the balance of the fleet, were unable to follow by reason of the rapidly forming ice to the southward of them, and when those two ships were last seen they were steering north into clear water. Within the next day or two an impassable barrier of ice must have been formed in the vicinity of Herald island, through which neither the *Jeannette* nor the missing whalers could have made their way either during the winter of 1879-80, or even during the past summer.

The life-history of Captain Ebeazer F. Nye, of the *Mount Wollaston*, is a startling romance of hair-breadth escapes from shipwrecks and positions of great danger, and he has been heard to say that he should not fear to winter in the Arctic with his vessel. Now, what is more natural than, when finding themselves thus cut off and closed in completely by ice in the straits south of them, and knowing for a certainty that they would be obliged to winter in the Arctic, a desire if possible to catch another whale or two and to get away the blubber to supply them with food necessary to withstand an Arctic winter? To satisfy their most pressing demand for winter food they would be obliged to keep in channels of open water, however far north such might extend at this season of the year. As the open area available to them trended northwesterly, continuing probably while the ten days of southerly winds which are known to have prevailed, their progress northward would be more easily effected.

Speculation Concerning Subsequent Movements of the "Jeannette."

The next consideration of the whalers would be, after obtaining food, to select a place to winter near some protecting shore, say Wrangell Land. Having seen the *Jeannette*, which they knew intended to winter far north, and observing her pass up that same northerly channel but five weeks before, it is quite natural that they should seek to reach a point, with a fair wind to favor them, at which they could hope to communicate with her most easily, either directly or by building a fire, whose rising smoke would attract her attention, knowing that a vessel so well fitted was the nearest and only source of assistance in case of pressing necessity. Captain Baudry is quite confident that, for some time after he left the whalers, the water continued open far north of where he last saw them, especially along the channel-way, where the current sets along the east coast of Wrangell Land and past Herald island. Whatever ice was formed above, was continually broken up and repacked into hummocky ice along the southern borders of the open water in the Arctic, and was built up upon this barrier until the open water to the north was filled with ice. The series of gales from the northwest which prevail in the Arctic late in

the season drift all loose ice southward from the vicinity of Herald island and the channels around Wrangell Land, and while thus packing this ice into impenetrable masses at the southern portion of the Arctic, he believes they must open a clear channel, which would enable Capt. De Long, with the *Jeannette* already in position and capable of steaming against a head wind, to penetrate to higher northern latitudes, if so inclined, and attain parallel quite inaccessible to any vessel which might enter the Arctic a year later. A repetition of the same class of weather and winds this year may again enable him, late in the season, even after the straits are closed, to follow northward along the eastern shore of Wrangell Land and to attain a still higher degree of latitude through open areas of water, on the borders of which wild geese, ducks and other sea-fowl go annually to rear their young.

Icebergs in the Arctic.

Captain E. E. Smith, who was ice pilot of the revenue cutter, *Thomas Corwin*, and who has made 13 trips to the Arctic, spending one winter among the Inuits, says that icebergs are not formed in the Arctic on the Pacific side. There is only what is termed hummocky ice, which may, however, be piled 100 ft. thick. He has seen such ice aground in 10 or 12 fathoms of water. Captains estimate the average thickness of ice where it freezes without displacement, at about 21 ft. Capt. Thomas Long, in 1867, remained for three days within 15 miles of Wrangell Land and made a drawing of the coast from Cape Thomas to Cape Hawaii. Several high peaks were seen. Although frequently seen, it is admitted that no person has yet succeeded in landing upon this generally

the winter. As the two whalers would naturally keep together, it is probable that the less staunch vessel was abandoned and its timber used for fuel.

The past winter having been an unusually severe one, the ice barrier extended further down than usual, and it is probable that the open passage in the main body of ice further north was late in opening, and that the *Jeannette* was unable to move clear of the ice bodies adjoined to the shore where she wintered, so as to make any headway this summer before the retreat of the whaling fleet. If the whalers are frozen in near her, the same result applies to them.

Although the *Jeannette* may not have been able to accomplish much during the past severe season, the experience gained by her trained crew place her in the best possible position for future work, and the second winter of an Arctic cruise is the one to which all experienced Polar voyagers look for the accomplishment of the most effective sledge-work and important explorations. Few experienced students of Arctic discoveries and previous expeditions will believe that in a single season she could have been reached by any vessel dispatched to accomplish in one short summer, a distance which the *Jeannette* required over one year, with two summer seasons to accomplish.

Newly Discovered Land.

In the course of the paper, Mr. Brooks stated that a new land had been discovered north of Point Barrow, and was for the first time laid down by him on the map exhibited. This new land was called Keenaa's land, from the fact that it was first seen by Capt. Keenaa, of the whaling bark *James Allen*, while "boiling down," about 100 miles north of Point Barrow.

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Our engraving is taken by permission from Conkling's forthcoming work entitled "Picturesque Northwest."

THE Scadden Flat G. M. Co. has sustained a loss of between \$18,000 and \$20,000, owing to the burning of their hoisting works, and they now offer \$1,000 reward for the arrest and conviction of the incendiary.



FORT WRANGELL WITH ITS MISSION CHURCH AND SCHOOL.

unapproachable terra incognita.

No News From the Natives.

Dr. W. H. Dall, acting as assistant in charge of the U. S. Coast and Geodetic Survey in Alaska, just returned from a cruise in the *Yukon*, and states that in his intercourse with the natives he had received no news of the *Jeannette*. None of the whalers in the Arctic this year have received any tidings of this vessel. The *Thomas Corwin* made five trips across the Arctic basin, besides visiting every available point along the coasts of Alaska and Siberia. In visiting Point Barrow he found the ice packed to within four miles of the shore. When at Cape Lisburne the crew mined and took on board 25 tons of excellent coal from surface croppings. It burned well, making steam readily and giving off little more smoke than anthracite. Captain E. E. Smith informed Captain De Long of this abundant supply of coal.

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With the facts as far as known before us, we may reasonably argue that had any abandonment of the *Jeannette* taken place, with her 76 trained dogs, her seven dog-eared and two experienced Inuit hunters, all admirably trained and equipped for ice travel, and the large stock of carefully prepared pemican which she carried, the sled parties would have made for the southern edge of the ice-pack near Herald island and as the most natural of all spots frequented by American whalers, to whom alone they could confidently look for relief. Having abundant proof that no such parties appeared, we may feel assured that the *Jeannette* is safe and sound, and that her polar voyage of scientific exploration is proceeding favorably according to the plan of its enterprising and generous patron. It is fair to presume that she passed northward along the unknown coast of Wrangell Land beyond immediate communication, just as all on board fully hoped and intended.

From the last reliable reports of the "Jeannette" and her position,

It is not unreasonable to suppose the *Jeannette* passed a cold but quiet winter, frozen in the ice north of Wrangell Land, in about 78°, fully 300 miles beyond any communication. The missing whalers, *Vigilant* and *Mount Wollaston* may have kept the *Jeannette* company during

Far over the ice to the north Capt. Keenan saw a range of high hills. This high land could be distinctly seen. The presence of this land, and the fact that the ice persists on the northern borders of the Kuro Siwo, argues, it is thought either an archipelago or a very large body of land to the north.

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Captain Williams said that he had seen the smoke of the *Jeannette* September 7, 1879, and not as stated before. At that time the smoke bore almost due south from Herald island. He remained in the same place for two days after he saw the smoke, and as the hull of the *Jeannette* did not rise above the horizon, it was likely that she was going north. Capt. Nye, of the *Mount Wollaston*, who came on board Capt. Williams' vessel, said that he also had seen the smoke to the north. It is likely that, after Capt. Williams left him, Capt. Nye went to the north of Herald island.

Arctic Exploration.

Cruties of the "Jeannette" Discussed by the Academy of Sciences.

At the meeting of the California Academy of Sciences a very interesting discussion took place regarding the *Jeannette* expedition to the Arctic. A very large audience was present, including Capt. Hooper, of the revenue cutter, *Corwin*, and his officers; Mr. W. H. Dall and Mr. C. De Long, of the U. S. Coast Survey, and several other captains, all of whom had been in the *Jeannette* this summer. Among the audience were a number of persons interested in Alaska and to whom the subject of Arctic exploration generally is of interest. The proceedings were opened by Mr. Chas. Wolcott Brooks, who presented a very elaborate paper on the subject of Arctic exploration. He had gathered the main facts regarding the conditions in the Arctic from conversations with the whaling captains, and by examination of their logs.

Last Seen of the "Jeannette."
After coaling at St. Michaels, the *Jeannette* sailed through Behring's straits, made a stop at Sarsos on the northern coast of Siberia to get letters, from which point he evidently sailed direct for the southeasterly point of Herald island, near which he was seen, Sept. 1, by Capt. Barnes, of the whaler, *Sea Breeze*. The next day the smoke from his smoke-stack was seen by several other whalers, who were to the northward of the *Sea Breeze*. He was still sailing northward. This was the last that has been seen or heard of the *Jeannette*. Mr. Brooks proceeded to present such information as he had been able to gather from the whaling fleet in regard to ice, winds, etc., from which it appears that the Arctic was peculiarly fortunate, as undoubtedly found an open passage between ice barriers along the eastern coast of Herald island, and thence along the coast of Wrangell island for 200 or 300 miles. The whaling ground below Herald island was such as indicated a most favorable opportunity for the *Jeannette* to take her way north. The whaling fleet did not leave the vicinity of Herald island until about the middle of October, some six weeks after the *Jeannette* sailed up and through the fleet, but not far enough to any ship to have communication. When the fleet left the

Two Missing Whalers.

The *Vigilant* and *Mount Wollaston* which were considerably to the northward of the balance of the fleet, were unable to follow by reason of the rapidly forming ice to the southward of them, and when those two ships were last seen they were steering north into clear water. Within the next day or two an impassable barrier of ice must have been formed in the vicinity of Herald island, through which neither the *Jeannette* nor the missing whalers could have made their way either during the winter of 1879-80, or even during the past summer.

The Life-Story of Captain Ebenezer F.

Nye, of the *Mount Wollaston*, is a startling romance of his life-escape from shipwrecks and positions of great danger, and he has been heard to say that he should not fear to winter in the Arctic with his vessel. Now, what is more natural than, when finding themselves thus cut off and closed in completely by ice in the straits north of them, and knowing for a certainty that they would be obliged to winter in the Arctic, a desire if possible to catch another whaler or two and at once away to the north to supply them with food necessary to withstand an Arctic winter? To satisfy their most pressing demand for winter food they would be obliged to keep in channels of open water, however far north such might extend at this season of the year. As the open area available to them transpired northwesterly, continuing probably while the ten days of southerly winds which are known to have prevailed, their progress northward would be more easily effected.

Speculation Concerning Subsequent Movements of the "Jeannette."

The next consideration of the whalers would be after obtaining food, to select a place to winter near some protecting shores, say Wrangell Land. Having seen the *Jeannette*, which they knew intended to winter far north, and knowing her pass up that same northerly coast about five weeks before, it is quite natural that they should seek to reach a point, as far north as they could, at which they could either directly or by building a fire, whose smoke would attract her attention, knowing that a vessel as well fitted was the nearest source of assistance in case of pressing need. Captain Bauldry is quite confident that some time after he left the whalers, the water continued open far north of where he saw them, especially along the channel between the current acts along the east coast of Wrangell Land and past Herald island. When ice was formed above, was contained up and repacked into hummocky ice along the southern borders of the open water.

the season drift all loose ice southward from the vicinity of Herald island and the channels around Wrangell Land, and while thus packing this ice into impenetrable masses at the southern portion of the Arctic, he believes they must open a clear channel, which would enable Capt. De Long, with the *Jeannette* already in position and cable of steaming against a head wind, to penetrate to higher northern latitudes, if so inclined, and attain parallel quite inaccessible to any vessel which might enter the Arctic a year later. A repetition of the same class of weather and winds this year may again enable him, late in the season, even after the straits are closed, to follow northward along the eastern shore of Wrangell Land and to attain a still higher degree of latitude through open areas of water, on the borders of which wild geese, ducks and other sea-fowl go annually to rear their young.

Icebergs in the Arctic.

Captain E. J. Smith, who was ice pilot of the revenue cutter, *Thomas Corwin*, and who has made 13 trips to the Arctic, spending one winter among the Innuits, says that icebergs are not formed in the Arctic on the Pacific side. There is only what is termed hummocky ice, which may, however, be piled 100 ft. thick. He has seen such ice aground in 10 or 12 fathoms of water. Captains estimate the average thickness of ice here it freezes without displacement, at about 21 ft. Capt. Thomas Long, in 1867, remained for three days within 15 miles of Wrangell Land and made a drawing of the coast from Cape Thomas to Cape Hawaii. Several high peaks were seen. Although frequently seen, it is admitted that no person has yet succeeded in landing upon this generally

the winter. As the two whalers would naturally keep together, it is probable that the less staunch vessel was abandoned and its timber used for fuel.

The past winter having been an unusually severe one, the ice barrier extended further down than usual, and it is probable that the open passage in the main body of ice further north was late in opening, and that the *Jeannette* was unable to move clear of the ice bodies affixed to the shore where she wintered, so as to make any headway this summer before the retreat of the whaling fleet. If the whalers are frozen in near her, the same result applies to them.

Although the *Jeannette* may not have been able to accomplish much during the past severe season, the experience gained by her trained crew place her in the best possible position for future work, and the second winter of an Arctic cruise is the one to which all experienced Polar voyagers look for the accomplishment of the most effective sledge-work and important explorations. Few experienced students of Arctic discoveries and previous expeditions will believe that in a single season she could have been reached by any vessel dispatched to accomplish in one short summer, a distance which the *Jeannette* required over one year, with two summer seasons to accomplish.

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From the last report.

"Jeannette" It is not unexpected that she has passed a cold winter in the north of the Arctic.

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Chiricahua, Arizona.

A correspondent of the *Arizona Citizen* writes as follows: I have got something to tell you about a new thing that is yet to decorate and adorn the map of this great and growing country. I have in this a direct reference to the new town of Chiricahua City. The name is hard to spell, but easy to pronounce (cherry cow); but I expect some of the hoodlums will get it "red cow" the first time. It is located on a beautiful mesa or plateau of land, with at least 200 acres without a break, and slightly undulating toward San Simon valley. The rush for lots became a stampede. Tents went up every 15 minutes, fence poles, wickiups, hockells and all kinds of cheap improvements were in order. There are from 20 to 40 people coming into the camp every day, most of them from the eastward; and we hear of very many from Leadville, Silver City, Tombstone, Harshaw, and Tucson, who are on the way with stores, saloons, restaurants, corrals, etc. In fact, the racket is a big one, and everybody is tumbling to it.

Now about the country—where is it and what about it? Well, the country in general is the Chiricahua mountains, from Camp Bowie to the Mexican line, but on the east side of the mountains only. The new town and camp is 25 miles southwest from San Simon station, on the railroad. By wagon road it is 25 miles southwest of Camp Bowie.

Ten miles from Bowie to the southeast is Wood canyon, where good mines of gold, silver and lead were first discovered a little over two months ago. Then, from Wood canyon around the head of the foot-hills via San Simon valley, a distance of 15 miles, is Chiricahua City, the head center of all this great racket. It is in the center of a mineral belt about 20 miles in length, and about 5 or 6 in width, on the foot-hills of the eastern slope of the mountains. There is plenty of wood, and water, and grass in all directions.

There are three running streams of water coming out of the mountains, the principal one of these being the Turkey Creek East, on which the new town is located. It runs through the western side of the town. I cannot go into an account of the undeveloped mines for there are too many of them. In these two districts, the California and Chiricahua mining districts, there are already about 1,000 locations, and more being made every day.

The Texas and Dun mines have been hought by some Oil City men, who have organized the Texas Con. mining company, and have ordered a smelting furnace, and are hurrying forward lumber and material of all kinds, for offices, boarding houses, and everything else needed. Within 60 days from this date they intend to be shipping 10 tons of bullion per day.

Wood for coal is abundant in every direction for miles, and some timber abounds over a country 12 miles long by 5 miles wide. The large bodies of ore are generally carbonates of lead with iron oxides, and sometimes copper; in fact, there are some good copper mines in the district.

Drift Mining about Lowell Hill.

Mining in the gravel deposits in the vicinity of Lowell Hill, on the divide between Steep hollow and Bear river, is being carried on actively, by means of tunneling and drifting. The tunnel of the "Golden Bull," now known as the "Morgan" above the town of Lowell Hill is in between 1,500 and 1,600 ft., from which good pay gravel is being taken out. The claim is under the superintendence of Capt. Mikel, an experienced gravel miner from Howland Flat, Sierra county, and is fitted up in the best kind of shape for working—the tunnel being well constructed and the sluices and all the improvements about the claim showing skillful direction and management.

The Swamp Angel tunnel having run out of grade the company is reaching their ground with a bed rock drift from the East New York tunnel, and have about 400 ft. yet to run to strike the gravel lead, when washing will be resumed. The Swamp Angel has a large extent of valuable ground.

The "Steep Hollow" (the Dewey claim) tunnel is in a distance of 1,700 ft., and has yet 280 ft. to go to reach gravel. The tunnel is being driven with a Burleigh drill, at the rate of four ft. a day. The tunnel is low enough to be at the bottom of the channel, and in this respect has the advantage over most of the tunnels in that section, as they have generally been found too high.

Operations in the Planet claim have been suspended, as on account of the tunnel being too high it was found difficult and expensive to contend with the water and open the ground. The company have concluded to wait until the tunnel in the Dewey claim (being adjoining ground) has bottomed the lead, and shown the precise level at which the proposed new tunnel of the Planet will have to be located. This will be determined during the present winter, and next spring the Planet company will commence driving a new tunnel. In the meanwhile the only work that will be done in the claim will be in replacing some of the old timbers in the present tunnel with new.

All the above named companies are on the gravel channel, which is extensive, and has been sufficiently worked to demonstrate its value. These are all drift claims, and can only be exhausted after many years of labor.—*Grass Valley Union.*

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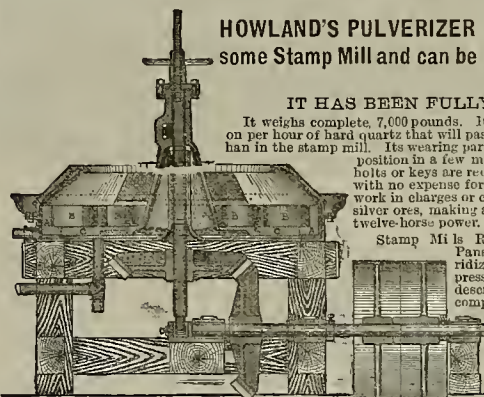
By a young man who thoroughly understands assaying all kinds of ores. A graduate of Kustel & Riote, to whom he refers. Address his father,

F. HOFLING, Jewelry Store, No. 5 Third St., S. F.

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HOWLAND'S PULVERIZER Takes the Place of the Cumbrous Stamp Mill and can be put up in one day ready for work.

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It weighs complete, 7,000 pounds. It costs \$1,250 ready for the belt. Will crush one ton per hour of hard quartz that will pass through a 40-mesh screen. The wear is less than in the stamp mill. Its wearing parts are plain castings and can be dropped into position in a few moments, as shown by the letters A, B and C, no bolts or keys are required; it can be set upon the floor of a mill with no expense for foundations, and can be used to crush and work in charges or continuous. It will amalgamate either gold or silver ores, making a simple, cheap and effective mill. It requires twelve-horse power.

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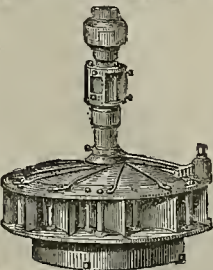
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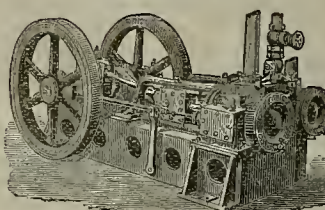
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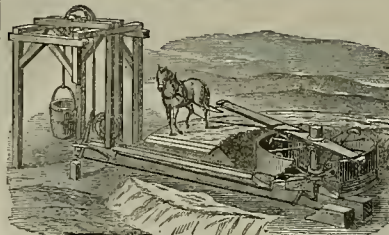
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING NOVEMBER 23D, 1880.

234,648.—OPENING CANS.—J. N. Arment, Dayton, W. T.
234,733.—SNAP HOOK.—G. E. Bales, Walla Walla, W. T.
234,701.—HARNESSES.—T. C. Churchman, Sacramento, Cal.
234,710.—FAULTER.—P. Heitzelman, S. F.
234,798.—FURNACE.—J. J. Napier and J. M. Thompson, S. F.
234,725.—PACKING BOX.—L. Racouillat, S. F.
234,862.—COMPOUND.—M. A. Reeves, Merced, Cal.
234,793.—AIR COMPRESSOR.—J. M. Stockmen, Los Angeles, Cal.
234,826.—DRY WASHER.—J. Waugaman, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

COMPOUND FOR CATARRH.—Mrs. Mary A. Reeves, Snelling, Merced Co., Cal. Patented Nov. 23, 1880. No. 234,808. This compound is employed for the treatment of diseases of the mucous membrane and skin, it being especially efficient for catarrh, scald-head, and diseases of the scalp, which cause a falling off of the hair.

DRY ORE WASHER.—John Waugaman, Los Angeles, Cal. Patented Nov. 23, 1880. No. 234,826. The object of this invention is to separate from earth or gravel the gold contained therein, without the use of water; and the improvements consist in certain combinations of screens and aprons, with peculiarly operated double bellows, furnishing an alternate air blast, by means of which the gold is separated from the earth or gravel. We have already illustrated this invention and described it in detail.

WHEEL-HUB.—G. J. Overshiner, San Jose, Cal. Patented Nov. 30, 1880. No. 235,007. This device consists in a peculiar formation of an inner hub of wood, with exterior enclosing shells and flanges, and in a means for securing the spokes in sections, which are held in the hub by bolts, so that said sections may be moved outwardly to set the tires when they become loose. By this construction a strong, serviceable wheel is made, with a means for keeping the tire tight without continual resetting.

ELEVATOR.—A. W. Castles and C. U. Akin, Eureka, Nev. Patented Nov. 30, 1880. No. 234,956. This invention relates to certain improvements in safety apparatus for hoisting devices such as are used in mines; and it consists in a means by which the weight of the descending cage is utilized as a source of power for operating some desired machine, and through the means of the governor of such machine, regulating the speed of its own descent; in a peculiarly operating wheel and lifting bolt for the cable by which the cage may be stopped by the men in the cage, without reference to the engineer on the surface; in a peculiarly operated and constructed detaching apparatus for preventing overwinding, and in providing a supplemental reel and rope for engaging with the released cable when overwinding occurs, the rotation of this reel by the cable causing levers to operate which automatically shut off steam from the hoisting engine, and throw on the brake. We shall give a more complete description of this apparatus in a future number.

OREGON MINING STATISTICS. The Oregon Sentinel says: The following statistics in regard to mining in Jackson county are taken from the records in the County Clerk's Office, as compiled by W. J. Plymale, Deputy Clerk: Number of mine locations in the several mining districts of Jackson county from Oct. 29, 1856, to June 30, 1880—Big Applegate, 466; Little Applegate, 39; Uniontown, 2; Sterling, 151; Jackson, 491; Jacksonville, 1,463; Forty-nine, 234; Willow Springs, 785; Gold Hill, 361; Galls Creek, 95; Footh Creek, 258; Evans Creek, 115; Sardine Creek, 132; Louse Creek, 25; Dry Diggings, 33; Jump-off Joe, 114; Grave Creek, 224; Cayote Creek, 75; Poorman's Creek, 300; Steamboat 45. Of these 16 were copper locations, 124 were cinnabar, 1 tin, and the balance gold and silver. During the same time there were 1,221 conveyances of mining claims recorded and 133 transfers of water ditches. All of the above was compiled for the use of the census department.

THE AMERICAN EXCHANGE hotel, so well known to all the traveling public, has been refitted, overhauled and put in first rate condition, and is now under the management of Charles Montgomery, proprietor of the three "Montgomery Hotels" on Second street, in this city. He is an old hotel man, having had many years experience. He will run the American Exchange on improved principles. The building has been thoroughly renovated.

News in Brief.

VEFUVIUS is in active eruption. The yellow fever is raging in Guayaquil. The revolution in Ecuador has been quelled. The crown jewels of France are to be sold.

THE St. Lawrence is frozen over at Montreal.

A CYCLONE in Missouri has done considerable damage.

ALL arriving steamers report unparalleled gales on the Atlantic.

HAGGIN & CARR have 45 teams canal-building in Kern county.

CRAWFORD'S Opera House, Topeka, Kansas, is burned. Loss, \$30,000.

THE New York coffee firm of B. C. Arnold & Sons has failed for \$1,000,000.

DURING November the Mints coined \$5,574,000 gold and 2,300,000 silver dollars.

FRANCOIS ANDERWERT has been elected President of the Swiss Confederation.

A BILL has been introduced in Congress, making the President's salary \$25,000.

A FUND of \$100,000 has been raised at Philadelphia as a present to General Grant.

THE President recommends that Grant be made Captain-General of the U. S. Army.

THE remnant of Victoria's band have murdered 30 persons near Chihuahua, Mexico.

It is reported that McDowell's name heads the list of retired officers sent to the Senate.

SERIOUS dissensions have again broken out in the British Cabinet over the Irish question.

SEVEN persons were killed in Chicago Tuesday morning by a switch engine running into a street car.

THE Arlington Hotel at Winnemucca was burned to the ground on Saturday; loss, \$10,000; insured for \$6,000.

THE House is inclined to be liberal in appropriations, and devote more to the internal improvements this year.

ONE of the provisions of the new Chinese treaty is that Americans shall not import opium, carry the product coastwise or sell it.

GENERAL HAZEN has been appointed Chief Signal Officer, and General McCook is promoted to the Colonels of the Sixth Infantry.

A CONTRACT is already closed for building 200 miles of the Mexico, Kansas, and Texas railroad, and work will begin at Fort Worth forthwith.

It is reported that Gen. Schofield will be relieved of the command of the Military Academy, and that he or Miles will be sent to San Francisco.

A GRAND international cotton exposition is contemplated in one of the Southern cities, for the exposition of cotton appliances and machinery.

A NUMBER of indictments for manslaughter have been found in connection with the burning of the steamboat *Seawanhaka* near New York some months ago.

THE Kearsarge mills, at Portsmouth, N. H., were burned recently. Loss, \$500,000. An operator was burned alive and 350 hands thrown out of employment.

TELEGRAMS from Waterford to the Dublin newspapers say that arms are being sold to an extraordinary extent, and that the whole country is armed to the teeth.

CLEAR LAKE swarms at this season with geese, swan and all species of ducks—mallard, canvas-back, spoon-bill, widgeon and teal—as well as curlew and sand-hill cranes.

AN investigation shows that 400,000 acres of land in Oregon, claimed by the Willamette valley and Cascade mountain military wagon-road company, has not been earned.

THE heaviest foreign mail which ever left New York Postoffice was dispatched last Wednesday by the outgoing steamers. It contained 106,578 letters and 192 bags of papers.

EVIDENCE increases of the rapid spread of the Land League terrorism, and honest tenants are becoming restive under it. Owners and agents say the condition is worse than months ago.

PARNELL's plan is to leave Dublin for London the moment that his trial is called, and by means of a resolution, to bring the Irish question before the Commons at the meeting of Parliament.

EXCHANGES at New York the past week excelled in magnitude those of any like period in the history of the Clearing-house, being over a billion dollars. In Chicago the gain from last year was over 51%.

SAYS the Sutter Banner: We understand that the leveeing throughout our levee districts is now completed and ready for the annual test, consequently there are many laborers thrown out of employment.

A MAN who is engaged in boring an artesian well nine miles southwest of Bakersfield struck water at the depth of 390 ft., but he continued until he reached a depth 592 ft. In this distance he met with 14 artesian channels.

In conversation with an intimate friend the President is reported to have expressed disfavor with the proposed scheme to raise a fund by popular subscription, to pension the ex-Presidents. He does not believe in it.

A MOST ghastly tragedy was enacted Tuesday near Chester, Ill. Louie Lockstein, a victim of religious excitement, escaped from his keepers and murdered three persons. In attempting to continue his work of blood, he was overpowered and captured.

Miners' Wages.

The statement is made that mine owners are planning to reduce the price of wages on the Comstock to \$3.50 per day for underground work. It is also said that the Miners' Union will resist the change, and a lock-out will be the result. The statements are made by the Carson Appeal, on the authority of Comstock miners. There have been rumors of this kind in the air for some time. We hope, however, they will prove to be without foundation.

It is admitted, of course, that the Comstock is not as prosperous as it once was, and that it is more difficult to collect assessments and keep the mines running. It is thought pretty hard by some stockholders to have to pay what they call high wages, during times when the mines are not paying dividends. It did not occur to these same stockholders to raise wages any higher when the mines were paying dividends, though this work is just as hard one time as another.

There is no doubt that economy will have to be more rigidly practiced in working Comstock, as other mines, in the future. But this is beginning to economize at the wrong end. It seems to us that economy ought to be inaugurated at the offices instead of the mines. If employees have to be reduced in number, in a mining company, it seems as if the non-producers should first be dropped. Without the working miner the mine becomes a mere stock-jobbing operation, unworthy of notice. If wages are to be cut down, the people placed in position by the nepotism of directors or officers, the president and the hangers-on should first be looked to. The miners are the last who should be disturbed.

In some of the big companies there are many employees who could very well be dispensed with. There are many leaks which can be stopped, and many small economies practiced, which would do much to lessen expenses. In a general reduction the miners will, of course, have to stand their share. But it is time enough to begin on them when all the other sources of expense have been looked after.

The miners underground, on the Comstock, earn their money, and earn it hard. Working in a hot, close mine is no child's play. They carry their lives in their hands from the time they step on the cage till they are back on the surface again. Nobody who ever went down into one of these mines, will think \$4 per day too much pay for the men working there.

Some persons argue that wages should be no more there than elsewhere. But it should be recollected that there are no mines in this country as deep and hot as those on the Comstock. The wages are not high for the work done. Those on the surface receive higher wages in proportion to the work done, dangers undergone, and wear and tear on the system.

Let the companies begin at the highest, instead of the lowest, in cutting down expenses. Let them cut down salaries of Presidents, first. They are useless officers, anyhow, and might be entirely dispensed with, for that matter. Mines can be run without Presidents or any officer at all, but they cannot be run without miners.

[COAL]

Vaccination for Scab in Sheep.

EDITORS PRESS:—I desire to announce to your readers that I have discovered a method of protecting sheep from the scab disease by vaccination. The principle is identical with that involved in vaccination to prevent smallpox in the human species. I do not claim that my method of vaccinating sheep will prove an absolute prevention of skin disease, but it will either prevent or reduce the disease to a milder form, as vaccination in human kind reduces smallpox to varioloid. In the case of sheep there may, in some cases, be a slight surface irritation of the skin which can be easily removed, but there will be no attack of the scab in its well-known virulent and penetrating forms. Anyone desirous of inquiring into this new method of meeting the scab disease may address me at the Baldwin Hotel, San Francisco.

S. H. KENNEDY.

San Francisco, Dec. 8th.
P. S.—Address, after January 15, 1881, Omaha, Nebraska.

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SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

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METALS.

(WHOLESALE.)

WEDNESDAY M., Dec. 1, 1880.

IRON.—		
American Pig, soft, ton.....	32 00	@ 33 00
Scotch Pig, ton.....	28 00	@ 27 00
American White Pig, ton.....	—	@ —
Oregon Pig, ton.....	—	@ —
Refrined Bar.....	41 00	@ 42 00
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ —
Norway, according to thickness.....	8 1/2	@ 9
STEEL.—		
English Cast, lb.....	16	@ 18
Black Diamond, ordinary sizes.....	13	@ 15
Drill.....	9	@ 10
Flat Bar.....	—	@ 16
Flow Steel.....	9	@ 10
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 30
Sheathing, Tinned 14x18.....	—	@ 42
Nails.....	—	@ 42
Bells.....	38	@ 42
Old.....	—	@ 13
Bar.....	—	@ 22
Precipitate, 100 fine.....	18	@ 19
LEAD.—		
Bar.....	4 1/2	@ 5
Pipe.....	—	@ 6
Pipe, Soil.....	—	@ 8
Shot, Discount 10% on 500 Bags.....	—	@ 9
Drops, per bag.....	—	@ 2 10
Buck.....	—	@ 2 30
Chilled ".....	—	@ 2 50
TIN PLATES.—		
10x14 0 Charcoal.....	—	@ 10 50
10x14 1 C Coke.....	10	@ 00
Banca Tin.....	—	@ 25 00
Australian.....	—	@ 20 00
1 C Charcoal, Roofing 14x20.....	—	@ 10 00
20x22.....	20	@ 00
ZINC.—		
By the Cask.....	—	@ 10
Zinc Sheet 7x13 ft. 7 to 10, lb. less than cask.....	10 1/2	@ 11
Assorted sizes.....	4	@ 00 @ 75

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

EXTRA DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, DECEMBER 2, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, an Extra Dividend No. Twenty (23) of Seventy-five (75) Cents per share, was declared payable on Monday, December Thirteenth (13), 1880, at the office in this city, or at the agency of The Nevada Bank of San Francisco in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

Office of the Western Mining Company (Contention Mine), San Francisco, December eighth (8), 1880.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend No. six (6) of seventy-five cents (75c) per share was declared, payable the tenth (10th) instant. D. C. BATES, Sec'y.

Office—Room 79 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE
Silver King Mining Company.
SAN FRANCISCO, DECEMBER 7, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 12) of Twenty-five (25) Cents per share was declared, payable on Wednesday, December Fifteenth (15), 1880, at the office of the Company, Room 19, No. 328 Montgomery Street, San Francisco, Cal. Transfer books will be closed Friday, December Tenth (10), 1880.

JOSEPH NASH, Secretary.

REGULAR DIVIDEND NOTICE.

OFFICE OF THE
Standard Consolidated Mining Company.
SAN FRANCISCO, DECEMBER 2, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Twenty-two (22) of Seventy-five (75) Cents per share, was declared payable on Monday, December Thirteenth (13), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

ANNUAL MEETING.

THE ANNUAL MEETING OF THE
Stockholders of the Gould and Curry Silver Mining Company

Will be held at the office of the Company, Room No. 60, Nevada Block, No. 309 Montgomery Street, San Francisco, California, on Monday, the twentieth (20th) day of December, 1880, at one o'clock P. M. Transfer books will be closed on Thursday, December sixteenth (16th), 1880, at three o'clock P. M.

ALFRED K. DURBROW, Sec'y.

Alpha Hydraulic Gravel Mining Company.—Principal place of business, San Francisco, California. Location of works, Alpha Hill, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Nineteenth (19) day of November, 1880, an assessment, (No. 2) of Twenty (20) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. gold and silver coin, to the Secretary, at the office of said company.

Any stock upon which this assessment shall remain unpaid on the Twenty-fourth (24) day of December, 1880, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

JAMES IRELAND, Sec'y.
Office, No. 216 Sansome Street, San Francisco.

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J. P. CHAPMAN.....Assistant Treasurer.

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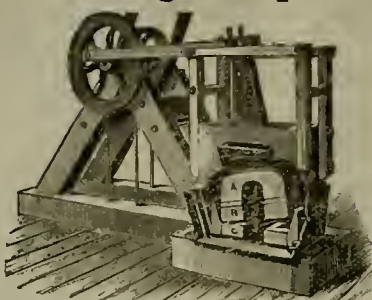
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It has no Stems, Cams, or Tappets, and Adjusts itself to the Wear of the Shoes and Dies.

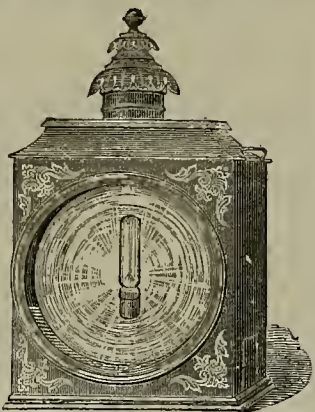
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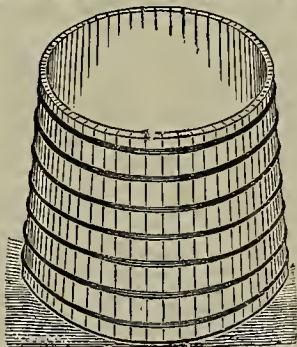


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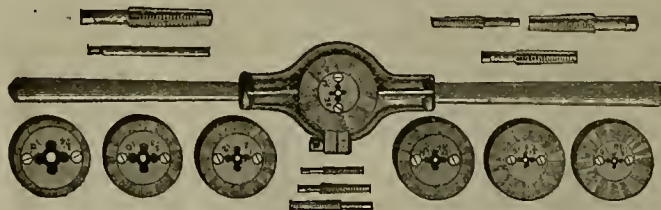


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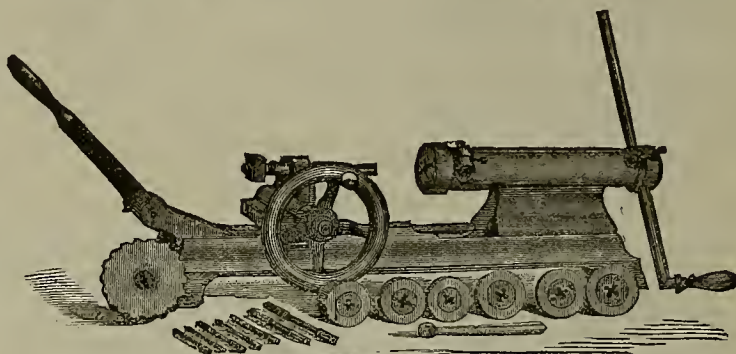
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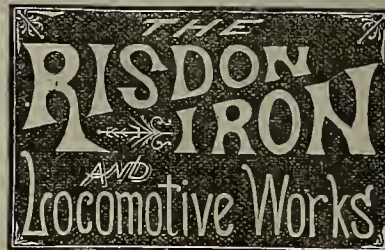
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visable.STEAM LAUNCHES, Barges and Steam Tugs con-
structed with reference to the Trade in which they are
to be employed. Speed, tonnage and draft of water
guaranteed.STEAM BOILERS. Particular attention given to
the quality of the material and workmanship, and none
but first-class work produced.SUGAR MILLS and SUGAR-MAKING
MACHINERY made after the most approved plans.
Also, all Boiler Iron Work connected therewith.WATER PIPE, of Boiler or Sheet Iron, of any size
made in suitable lengths for connecting together,
sheets rolled, punched, and packed for shipment ready
to be riveted on the ground.HYDRAULIC RIVETING. Boiler Work and
Water Pipe made by this establishment, riveted by
Hydraulic Riveting Machinery, that quality of work
being far superior to hand work.SHIP WORK. Ship and Steam Capstans, Steam
Winches, Air and Circulating Pumps, made after the
most approved plans.PUMPS. Direct Acting Pumps, for Irrigation or City
Water Works purposes, built with the celebrated Day
Valve Motion, superior to any other Pump.

San Francisco Pioneer Screen Works

J. W. QUICK, MANUFACTURER,

Several first premiums received
for Quartz Mill Screens, and Per-
forated Sheet Metals of every
description. I would call special
attention to my SLOT CUT and
SLOT PUNCHED SCREENS,
which are attracting much at-
tention and giving universal
satisfaction. This is the only
establishment on the coast de-
voted exclusively to the manu-
facture of Screens. Mill owners
solicitively can contract for large supplies at favorable rates.
Orders solicited and promptly attended to.

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SUCCESSOR TO

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PRINCIPAL OFFICE:

648 Market Street.

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SAN FRANCISCO.

All ordinary mending, sewing on buttons, etc., free of
charge. Orders left at the office will receive
prompt attention. Work called for and
delivered to any part of the
city free of charge.

RUBBER BELTING, Steam Packing,

Fire Engine, Hydrant and Suction Hose,

RUBBER VALVES,

GASKETS AND SPRINGS MADE TO ORDER
AT SHORT NOTICE.Rubber Boots and Shoes, Clothing, heavy and light, and
all other kinds of Rubber Goods, for sale by

The Gutta Percha & Rubber Man'g Co.,

J. W. TAYLOR, Manager,

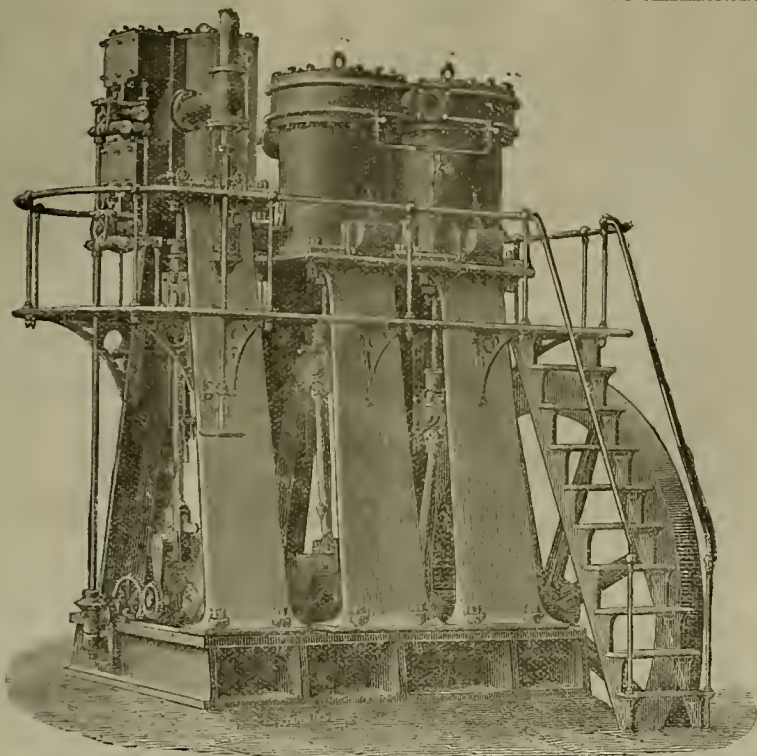
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TO MECHANICS—FOR SALE.

The Globe Iron Works,

FOUNDRY and MACHINE SHOP.

Cor. Main and Commerce Streets, near Steamboat
Landing, STOCKTON, CAL.



With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts

Mining Machinery Depot,

PARKE & LACY,

21 and 23 Fremont Street. S. F.

NO. 7 IMPROVED

AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

FRUE'S ORE CONCENTRATOR OR VANNER.
Plunger Jigs. Revolving Screens.
CRUSHING ROLLERS. SAMPLE GRINDERS.

FRASER & CHALMERS
STEAM ENGINES, BOILERS, STAMP MILLS, FRUE VANNERS
(and Machinery) for Systematic Mining, Milling, Smelting, and Concentration of Ores
No. 145 Fulton St. CHICAGO, ILL.

Howell's Improved White Roasting Cylinders.
REVOLVING CYLINDERS AND ORE DRYERS.
Hoisting and Pumping Machinery.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding homastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 XX is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

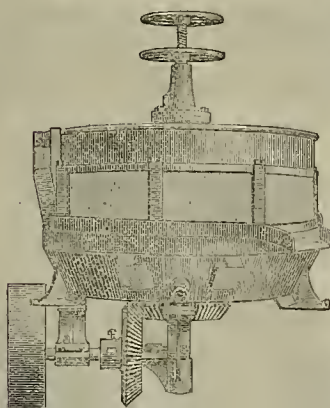
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ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

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Office, No. 230 California Street - - San Francisco, Cal.

STEIGER & KERR'S CONTINUOUS DISCHARGE AND GRINDING PAN.



This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all, and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable and simple, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often once used in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adopted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OCCIDENTAL

PACIFIC MACHINERY DEPOT.

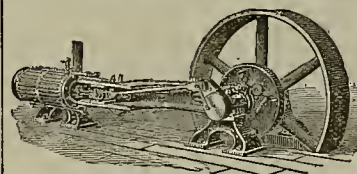
H. P. GREGORY & CO.,

Nos. 2 and 4 California Street, San Francisco.

Importers and Dealers in every description of

MACHINERY!

Sole Agents for the Pacific Coast for



BUCKEYE Engine Company.

J. A. Fay & Co.'s Wood-Working Machinery; Bement & Sons' Machinists' Tools; Blake Steam Pumps; N. Y. Belt- ing and Packing Co.'s Rubber Cords; Startevant Blowers and Exhaust Fan; Tanite Co.'s Emery Wheels and Ma- chinery; Payne's Vertical Engines and Boilers; Perry's Centrifugal Pump; Judson's Standard Governors; Dreyfus Self-Oilers; Gould Mfg Co.'s Hand and Power Pumps; Eclipse Windmills; Disston & Sons Circular Saws; Otto Silent Gas Engine; Dues's Elevator Cups; Ballard's Oak Tanned Belting; Also on hand and for sale A FULL LINE OF MILL AND MINING SUPPLIES.

NOTICE!

ENGINEERS, DEALERS AND USERS OF STEAM PUMPS

Will Please take notice that we have taken the sole agency for the KNOWLES' STEAM PUMP, for the Pacific Coast States and Territories, and keep a full stock of Pumps and Duplicate Parts on hand at all times

PARKE & LACY,

Nos. 21 and 23 FREMONT STREET.

San Francisco, Cal., September 23, 1880.

In consequence of Spurious Imitations of LEA AND PERRINS' SAUCE,

Which are calculated to deceive the Public, Lea and Perrins have adopted A NEW LABEL, bearing their Signature, thus,

Lea & Perrins

Which is placed on every bottle of WORCESTERSHIRE SAUCE, and without which none is genuine.

Ask for LEA & PERRINS' Sauce, and See Name on Wrapper, Label, Bottle and Stopper. Wholesale and for Export by the Proprietors, Worcester; Crosse and Blackwell, London, and by Grocers and Oilmen throughout the World.

"THE \$1,000 CHALLENGE"

Ore Feeder for Quartz Mills.

OVER 750 ARE NOW IN USE, GIVING ENTIRE SATISFACTION.

Awarded First Premium at the Tenth and Twelfth Industrial Fairs of the Mechanics' Institute.
Twenty Per Cent. More Ore Crushed with Fifteen Per Cent. Less Wear of Iron than by Hand Feeding.

The accompanying cut illustrates the recently introduced Grip, and also the Spring Attachment, which replaces the Weight heretofore used, and which are obvious improvements.

It is now fully demonstrated, after careful and long continued experimentation and practical use, that the plan upon which a perfect Ore Feeder must be constructed is that of a carrier, and not that of a shaking-table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Jerky or spasmodic contrivances will not answer the purpose for wet or sticky ores.

The Challenge Ore Feeders are now in Use in the following Mills, besides many others:

Soulsby.....	20	Stamp.....	Tuolumne county, Cal.
Sheep-Ranch.....	20	"	Calaveras " "
Maboney.....	40	"	Amador " "
Zelle.....	40	"	" " "
Flacerville.....	40	"	El Dorado " "
Gross.....	80	"	" " "
Julian.....	20	"	Placer " "
St. Patrick.....	15	"	" " "
Providence.....	20	"	Nevada " "
Omaha.....	10	"	" " "
Green Mountain.....	60	"	Plumas " "
Plumas Eureka.....	60	"	" " "
Bulwer-Standard.....	30	"	Bodie Dis. Mono, " "
Standard.....	20	"	" " "
Noonday.....	30	"	" " "
Bodie.....	10	"	" " "
Christy.....	5	"	Utah Co, Utah, " "
Ontario.....	40	"	Parley's Park, " "
Contention.....	20	"	Tombstone Dis, Arizona " "
Grand Central.....	20	"	" " "
Harsbaw.....	20	"	Patagonia, " "
Sunshine.....	20	"	Idaho Springs, Col. " "
Homestead.....	200	"	Black Hills, Dakota. " "
Father De Smet.....	50	"	" " "
Hidden Treasure.....	40	"	" " "

Superiority of the "Challenge" Ore Feeder Demonstrated!

At the "Christy" Mill, Utah Co., Utah, the "Eclipse" Feeder, (conceived by E. Coleman) were introduced, but not carrying a regular supply of ore for the crushing capacity of the stamps, was replaced by the "Challenge" Feeder, which are now running and the stamps crushing forty (40) per cent. more ore than was done by the "Eclipse."

The "Harsbaw" or "Hermosa" Mill, of Patagonia District, Arizona, was also originally fitted with "Eclipse" Feeders, but after a few weeks trial they were pronounced inadequate to the work, discarded, and the "Challenge" adopted.

The "Silver King," Mill of Arizona, also removed the "Eclipse" Feeders to give place to the "Challenge."

The "Sola" Mill, of Brown Valley, Yuba County, Cal., was fitted with "Victor" Feeders, manufactured by E. T. Steen, but proving insufficient, the "Challenge" Feeders were substituted.

Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Grantsville, Nevada, but after a fair trial were discarded, and Hendy's Feeders fitted, and four others of the same pattern added when the second twenty stamps were erected.

These cases are simply cited from among many similar instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

Mr. H. W. GREENWELL, of the Tingman Mine, El Dorado Co., or any other person can make \$1,000 by disproving the acknowledged superiority of my "CHALLENGE" Feeder, in a competitive trial, side by side, with any other Feeder, on wet or sticky ores from any mine, and I will give \$100 to any one who will procure the acceptance of this challenge, and arrange for a fair and impartial test on merit.

I mean business, Gentlemen, "either put up or shut up."

JOSHUA HENDY,

Manufacturer of all descriptions of Quartz and Saw Mill Machinery. A Large Stock of both New and Second Hand at Machine Works. Nos. 49 and 51 Fremont Street, San Francisco.

Agent for "BAKERS" Rotary Pressure Blowers.



VULCAN BLASTING POWDER.

The Strongest, Safest, Most Uniform and Reliable "HIGH EXPLOSIVE" Manufactured on the Coast.

MINERS TESTIFY THAT IT IS FREE FROM OBJECTIONABLE FUMES.

We call the attention of all desiring such a Powder to our various grades, which we are prepared to sell at LOWEST RATES.

No. 1.—Equaling Liquid Nitro-Glycerine in Strength. We recommend this Grade in extremely hard rock, boulders, iron, etc.

No. 2.—Will do this work thoroughly in all but the hardest kinds of rock.

No. 3.—For bench work, pipe-clay, soft and shelly rock, outside work and quarrying.

Single and Triple Force Caps, Fuse of all Grades, Vulcan Powder Thawing Boxes, Batteries and Explosives. For Sale at the Lowest Rates.

VULCAN POWDER COMPANY,

Office, 218 California Street, - - - - - SAN FRANCISCO, CAL.

GIANT POWDER

MANUFACTURED UNDER A. NOBEL'S ORIGINAL AND ONLY VALID NITRO-GLYCERINE PATENTS.

Nos. ONE, TWO and THREE.

Stronger, Better and Safer than any other High Explosive

Judson Powder

IS NOW USED IN ALL LARGE HYDRAULIC CLAIMS.

It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. 227 Triple Force Caps and all Grades of Fuse.

BANDMANN, NIELSEN & CO.,
SAN FRANCISCO, CAL.



The FRUE ORE CONCENTRATOR.

Adams & Carter, Agents.

JOHN M. ADAMS.

WM. F. CARTER

MINING AND MECHANICAL ENGINEERS.

GEO. S. LADD, President.

ANDREW WHITE, Secretary.

CALIFORNIA ELECTRICAL WORKS.

134 Sutter Street, San Francisco.

Telegraph Supplies, Instruments of all Descriptions.

FIRE ALARM TELEGRAPH BOXES, GONGS and BELL STRIKERS,

Model Machinery, Patent Office Models, Electro-Magnetic Blasting Machines and Supplies.

AMALGAMATING PLATES.

1 oz. of Silver Deposit to 1 square foot for \$3.

All orders promptly attended to.

PAUL SEILER, Superintendent.

CALIFORNIA Electric Light Company.

Owners of the Brush System of Electric Lighting for the Pacific Coast.

Apparatus for sale for Mines, Mills, Manufactories, etc.

Plating Machines and Machines for treating Ore manufactured to order.

Electric Light furnished on all the principal streets of the city.

Office—No. 119 O'Farrell Street,
SAN FRANCISCO, CAL.



We furnish Telephones for \$10 per set. Wire, 75 cents per rod; insulators, 15 cents each for every 200 feet of line. Illustrated instructions for putting up.

HOOVER TELEPHONE CO.,
328 Montgomery Street, S. F.

This paper is printed with Ink furnished by Chas. Eneu Johnson & Co., 509 South 10th St., Philadelphia & 59 Gold St., N. Y. Agent for Pacific Coast—Joseph H. Dorset, 507

A. S. HALLIDIE,
OFFICE, NO. 6 CALIFORNIA STREET,
SAN FRANCISCO.

Manufacturer and Dealer in all kinds of

Iron and Steel Wire Rope

Flat and Round, for Mining, Shipping, Hoisting and General Purposes.

Having the most complete and extensive Wire Rope Works in the United States, I am prepared to manufacture Wire Rope and Cables of any length or size at short notice, and guarantee the quality and workmanship equal to any made at home or abroad.

Iron, Steel and Galvanized Wire,
Of all sizes, on hand or made to order.

Barbed Fence Wire.

SOLE PROPRIETOR OF
Hallidie's Endless Ropeway,
For the Transportation of ores, etc.
Send for a Circular.

A. S. HALLIDIE,
Office, No. 6 California St., San Francisco.

N. W. SPAULDING'S



PATENT DETACHABLE TOOTH SAWS,
Manufactory, 17 & 19 Fremont St., S. F.

California Inventors Should consult DEWEY & CO., AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1830. Their long experience as journalists and large practice as patent attorneys enables them to offer Pacific Coast inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS, No. 202 Sansome St., San Francisco.

PATENT CAL. METALLIC WINDOW SCREENS.

This is the Best and Cheapest Window Screen ever offered to the public. Useful and Ornamental.

To exclude Flies and Mosquitoes, it has no equal. It is an article of comfort, convenience and economy, and needs only to be known to be deemed a household necessity.

J. REARDON, 328 Bush St., S. F.

AIR COMPRESSORS

PRICES REDUCED. SEND FOR NEW CATALOGUE.

CLAYTON STEAM PUMP WORKS
14 AND 16 WATER STREET, BROOKLYN, N. Y.

PEBBLE SPECTACLES.



Muller's Optical Depot,

135 Montgomery St., near Bush.

SPECIALTY FOR 30 YEARS.

WHOLESALE AND RETAIL.

The most complicated cases of defective vision thoroughly diagnosed, free of

MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 18, 1880.

VOLUME XLI
Number 25.

An Improved Portable Hoisting Engine.

The engraving given herewith is a representation of an improved portable hoisting engine, made by Merschutz & Cantrell, of the National Iron Works in this city. It is built especially for the requirements of this coast. The manufacturers have had some 20 years' experience in this class of work, having made a specialty of it. The changes made from time to time have been suggested by experience, and the result is that the improved hoist now made, and which we illustrate, combines all the improvements that practice has shown to be required.

All the parts are on a heavy cast frame. The reel is made from wire rope, with extra large gear wheels. The whole hoist is very strongly made to meet the requirements of the trade. The reversing of the engine is accomplished by link motion. The National Works make several sizes of this hoist. The largest size of this style is 8x12, and is adapted to hoist 1,000 ft. It weighs about 8,000 lbs. The smallest size will hoist 500 ft. It weighs about 5,000 lbs., and is 6x12 in size. The same style engines is also made with double cylinders, as some prefer them. They are all made strong, plain and neat.

A great advantage is that no skilled labor is required to set the engine up. They are all ready to be put to work as soon as they arrive on the ground. It forms a very cheap and good "rig" for opening a mine. In fact no simpler or cheaper one has been devised. Several of them have just been shipped from the foundry; one to the Carnero mine, Jucostitia, Mexico; one to the Betty O'Neil mine, Nevada, and one to the copper mine of C. Woolrich, Lower California. All who have used the hoist are well satisfied with it. The National Iron Works build all styles of hoists, having suitable patterns. The style we have described is a favorite, as it is so convenient. This outfit is kept in stock generally, and can be delivered when wanted.

THE IDAHO MINE.—This representative Californian mine (Nevada county) has just declared its 136th dividend. This \$15,500 makes a grand total of \$2,830,800 paid in dividends by the company. A paragraph has been floating about the press that the capital stock of the company had been increased to \$10,000,000 in 100,000 shares. Assuming the statement to be true, some of the papers have criticised the managers severely, and, as it turns out, needlessly. An inquiry addressed to the Secretary, George W. Hill, brought out the following reply: "No change whatever in the number of shares, Eastern papers to the contrary, notwithstanding." The number of shares is 3,100. This Idaho is not a gambling proposition. It is simply a business enterprise, owned and operated on legitimate principles by half a dozen men, who are content to divide the profits among themselves. The November product of this mine was \$41,586. Nearly \$3,000,000 in dividends has been paid since the opening of the mine. The annual meeting will take place on the third Monday in December.

THE EDGAR THOMPSON STEEL WORKS AT PITTSBURGH have lately received orders for 80,000 tons of steel rails, the demand coming principally from new roads pushing their way westward, and including the Texas Pacific, the Atchison and Topeka, Wahash and Louisville and Nashville. These rails range from 56 to 60 pounds to the yard, while the Baltimore and Ohio and the Pennsylvania roads, for all their heavier grades are securing rails which weigh 67 pounds per yard. It is estimated that the Edgar Thompson works alone in 1881 will roll 120,000 tons of rails, for all of which they have orders. These rails will supply 1,140 miles of roadway with steel track.

THE TOMBSTONE MILL AND MINING CO., of Arizona has declared the regular monthly dividend of 10c per share, payable at Philadelphia on the 15th. This is the ninth consecutive monthly dividend and the total is \$450,000.

The United States Compared With European Nations.

The total valuation of the natural wealth of the leading nations of the earth, according to the best authority, ranks as follows:

The United Kingdom of Great Britain and Ireland head the list with a capital valuation of 44,400 millions of dollars. Next comes France, with a valuation of 36,700 millions.

The third in order is the United States, with 32,000 millions.

Next follows Germany, with 22,000 millions; Russia, with 15,000 millions, and the Low Countries with 11,150 millions, collectively.

The average annual income, per inhabitant, of the various nations, makes a better showing for our own country, and presents the singular fact of an equal per capita income for both the United States and Great Britain of \$165 for each man, woman and child in the two countries. France ranks next with \$125. Then follow the British colonies with \$90; Germany,

sons with the cities of the United States. London alone, stands out in advance of any city in the United States—not only in its aggregate, but also in its actual increase of population. Apart from that city which most wonderfully maintains its supremacy by an increase of 366,000 in 8 years; the other great cities of England fall below the measure of the same class of cities in the United States. Liverpool is fully equalled by Brooklyn or Chicago. The great city of Manchester has gained only 10,630 in numbers since 1871; and that city together with Leeds and Bradford, jointly, contain a population only equal to that of Philadelphia alone. The great manufacturing cities of Sheffield and Birmingham, Liverpool and Hull, Newcastle and Bristol, which represent the commercial interests of England, have only increased 10% during the past 8 years. The great manufacturing city of Manchester has gained only 3% during the past 8 years; and it is quite noticeable to observe that the cities of Philadelphia, Brooklyn, Chicago and St. Louis are fairly running away from the ancient and historic cities of British commerce. The aggregate population of the 15 largest

is nearly as large as France, and quite as capable of supporting as large a population. If Texas was as densely populated as Massachusetts, and there is no reason why it might not become so, it would contain 52,000,000 souls. If the whole territory of the Union was so thickly settled as the State of Massachusetts, our population would reach 560,000,000. If it contained as many to the square mile as England, it would number a population almost equal to the entire globe at the present time.

Coal.

There are pretty good indications that the coal combination is coming to an untimely end. We do not know who the parties were who started in putting up the price of this most necessary article, but whoever they are, they have not been blessed, but rather consigned to regions where they wouldn't have any need for coal. Just at the beginning of winter, and when our weather cooled off so suddenly, as to warrant the belief that the winter would be as exceptionally cold as the last, we went the price of coal. The coal men evidently thought the weather was favorable. That people would remember last year and hasten to lay in a supply of fuel before the price went higher. Unfortunately for them, but fortunately for consumers, the old-fashioned rains came, with the usual California mildness of temperatures; the frost and ice disappearing before it in such a way as to gladden the hearts of all except coal men.

This gave consumers a chance to economize. They bought wood, used very little coal, and the full coal yards remained full, to the surprise and disgust of dealers, no doubt.

The Wellington coal is a favorite in this city and Oakland, and it led the market. It went towering up to \$20 a ton. But when high, it was found that people could and would do without it. And they did.

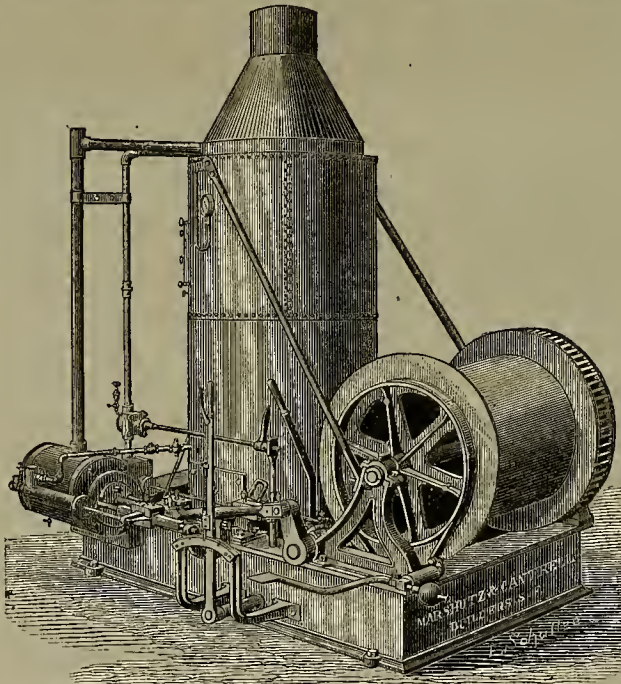
The result was sales fell off. Small lots were offered by outsiders at less than the high rates. This cutting in naturally brought the price down. So this week coal is a good deal lower than last. The rise in coasting freights which was claimed to be the cause of the rise, may have been a valid reason for raising prices a little. The people expect to be squeezed a little for one reason or another, whenever they particularly need any special article or substance. They stand these little impositions without very much grumbling. When, however, such a thing as coal is run up 25%, and then nearly up to 50%, they will not stand it. They will drop the thing altogether sooner than submit to the imposition. Freights went up a couple of dollars, while coal went up ever so many more dollars. At any rate the people refused to be swindled. The warm weather has held on so long that the coal men are getting a stock on hand bigger than they like probably. At all events, prices have begun to fall, and we hope to see them fall still farther in another week.

At the annual meeting of the Mexican Mining Co., the old management was re-elected for the ensuing year. The Superintendent anticipates that the expenses will be much lighter from this time forward, and speaks encouragingly of the prospects of the mine. The Company had \$31,092.93 in cash December 1st.

THE SILVER REEF MINER says that Mr. Tom McMasters, formerly Superintendent of the Stormont mill, has now under his control two mills of 120 stamps each, and one of 80 stamps, in Lead City; two mills at Deadwood of 60 stamps each, and one of 30, making in all 470 strong.

THE MINING DISTRICTS throughout Utah will make a good showing for 1880. Excitement has not run high in any of them, but the developments have been substantial and the production large. In refined bullion the showing is much larger than ever before.

THE NOVEMBER PRODUCT of the Standard Con. mine was \$188,720.



AN IMPROVED PORTABLE HOISTING ENGINE FOR MINES.

\$35; Scandinavia, also, \$85, while Russia, with her 90,000,000 of inhabitants, is quite out of sight. With her imperfect statistics, no reliable estimate of income can be made.

But it is in the annual accumulations of wealth that the United States far exceeds all other nations, leading off with 825 millions, while France follows next, but at a long distance, with only 375 millions; then comes Great Britain, with 325 millions, and Germany with 200 millions. The large increase of wealth in the United States since 1850, according to good English authority, would purchase the whole German empire with its centuries of accumulations, its farms, banks, cities, shipping, manufactures and mines. With these facts before the world, it is no wonder that Clare Sowell Read who, during the past year has visited this country in the interest of British industry, reported on his return that "the American nation is destined to become the greatest in the world;" or that a late number of the London Spectator should exclaim: "America excites the half-awake admiration of the world at her material prosperity!" Every day that the sun rises upon this nation there is more than two and a half millions of dollars added to its wealth.

The recent estimation of the population of English cities furnishes results which afford an opportunity to make some interesting comparisons

cities of England is 6,843,000. This includes London, which counts more than half the entire enumeration. The aggregate of the 15 largest cities in the United States is 5,654,282. Another decade will carry this municipal growth quite beyond the aggregate of the English cities, the majority of which date their importance back to or before the 14th century.

It was claimed as quite a triumph, in 1871, that there were 12 English cities which numbered a population of 100,000 or more. The present report brings that number up to 16. But the census of the United States, just completed, gives us twenty of that rank, with many others closely approaching it. If this comparison of cities was extended to the nations on the continent of Europe, it would be even more favorable for us than in its relation to England alone.

The future of the United States, when contemplated in the light and logic of statistics already realized, fairly staggers our faith. Our rapid increase in population and wealth, as shown by the census returns, is already the wonder of the world. We have all the elements for sustaining a population fully equal to that of the most populous nations of Europe. A few statistics in that direction may be interesting: Georgia is as large as England, and is capable of supporting 10,000,000 of inhabitants. California, with a little less than 1,000,000 of people,

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS

A Trip Down the Coast.—No 3.

San Diego and Vicinity.

EDITORS PRESS:—San Diego carried off the prize at the last Los Angeles Horticultural fair for oranges and other semi-tropical fruits. "But where are they grown?" asks the recent arrival at San Diego, as he glances over the broad, uncultivated mesa that stretches, apparently limitless, in every direction from this city except oceanward, where, on the opposite side of the bay, the long, low line of San Diego peninsula partially interrupts this view of the Pacific. The streets run into the bay at one end, into this mesa at the other. There are no cultivated fields, orchards and gardens close to the town as at Santa Barbara; no broad vega filled with fertile farms and laughing vineyards as at Los Angeles. All is brown and sere, cactus and sumach and sage divide the ground between them, and the greenest of these (in November) is cactus. But San Diego county is large, and there are farms in it which can be found by riding or driving far enough. Indeed, some are not far away, but they nestle in valleys invisible at a general glance.

East of San Diego,

Or rather southeast, lie in the order named Cholla, Spring, Paradise and Sweet-water valleys. All these are the beds of streams which either did exist, or do exist during some period of the year. I visited Cholla and Paradise valleys, Cholla, pronounced by Californians as if spelled *Choya*, is simply Spanish for a kind of cactus which abounds in that valley. Portions of the long, narrow strip that lies between the banks formed by the surrounding mesa are highly cultivated, and some pleasant residences occur at intervals. The soil, though tolerably rich, is mixed with stones and might be called gravelly, so that it is considered inferior on the whole to Paradise valley, where an alluvial deposit of considerable depth ensures good crops wherever water is furnished. There are 27 wind-mills in Paradise valley, all of the vertical pattern. The horizontal or turbine wind-mill either has not been introduced, or does not find favor. Most of

Paradise Valley is Richly Cultured,

And ground within and around it is held at a high price—from \$100 to \$300 per acre. At Mr. Ailesworth's, I was shown a terraced hillside covered with vines, and was assured that though they had not been irrigated or cultivated for the last two seasons, they had borne freely. But these vines were on the southern slope of the valley, thus having a northern aspect and gaining all the moisture possible. No care need be taken at San Diego to ensure a sufficiency of sun. The principal orange crop is in January, but oranges, lemons and limes ripen all the time. I am assured that in some cases oranges have been left upon the trees until the year following that in which they ripened, and have then been found to be passably good oranges, though somewhat inferior to new ones. The guava succeeds well, and its pleasant acid fruit is now ripe. Olives, bananas, palms, figs joined to more ordinary strawberries, tomatoes, etc., complete the principal features of this garden in the midst of the wilderness, forced by the aid of water from a soil which needs but moisture to be fertile. The wells in the valleys cannot be called artesian. The water-bearing stratum in Paradise valley is reached at about 40 ft. The particulars of one well are as follows. A four-foot hole was dug to a little more than 40 ft. in depth, when the water was reached. Thence it was continued downward some 17 ft. more, gradually widening until at the bottom it was eight ft. wide, thus forming a sort of subterranean reservoir with 17 ft. of water. The digging of this well, the curb, bank and its woodwork, pump and wind-mill cost some \$500. Another well on the slope of the hill cost rather less. Add to this the cost of the ground at its lowest price named above, the fencing, cost of trees and planting, and it is evident that it takes some capital to commence the raising of semi-tropical fruits. Then it must be remembered that an average orchard needs six years to produce, and eight to come into full bearing. Meantime this orchardist must grow something else for a living. By huddling on yearling stocks, fruit may be obtained in the second year, but I am told that the ultimate results of this prematurely forcing production are not favorable. "We think this the next thing to paradise," remarked a young lady acquaintance, but I observed that she dressed like other daughters of Eve; also that the frost had touched the fig leaves so that some of them were no longer fitted for aprons. The same invisible hand had nipped the bananas and driving at 10 A. M. was so cold that an overcoat was needed. November is always the coldest month of the year in southern California, but this year it is something extra, corresponding to the cold snap that is now passing through the whole country. At eight o'clock on

A Semi-Tropical Morning,

In this semi-tropical climate every inmate of the hotel was warming his hands over a semi-tropical stove; my friend, Von Blank, wore a handkerchief round his semi-tropical throat,

cidedly husky, and when I requested the young lady at the post-office to forward my letters to Los Angeles, she whispered "yet there," in a moist sort of manner. On the whole, this raising of semi-tropical fruits seems an uncertain kind of business; you put a fortune in the ground and wait; if the season is good and there is a market, you may get a living out, but how when the frost comes? How when the heated sorocco from the Colorado desert blows over the land, baking the fruit upon the trees? How when the supply exceeds the local demand, and only such fruits as can be dried or preserved at a profit can be utilized? Figs, I was told, do not pay to dry. The market of San Francisco can be supplied with figs from nearer at hand, it does not pay to freight them from San Diego. Olives, however, are in demand for oil and for pickles beyond the supply. It is this vine that will be the salvation of San Diego county. Hillsides and mesas, unfitted for oranges and bananas, will grow the grape luxuriantly, and this season grapes were sold in San Diego at \$20 per ton. Near Paradise valley are some ranches on the

Highlands of the Mesa.

By dint of great expenditures and careful cultivation they are said to be tolerably profitable, but it is noticeable that, although almost every one at San Diego will tell you that mesa land is good (some will say it is the best), scarcely anyone is cultivating the mesa, while solitary deserted cabins, broken fences, and a forlorn gum-tree or two remain here and there to show where the attempt has been made. All huddle in the sheltered valleys—they say the frosts take the valleys first, and that winds sometimes sweep through them, but the experience of my own skin tells me that the banks are a wind-guard, and, until trees can be grown, they are the only wind-guard in the comparatively low districts near the sea.

This shelter, the better soil, and the greater proximity of water, as well as the greater certainty of finding it, will always make the valleys worth more than the mesa.

Though low compared with the distant mountains, with San Miguel, that lifts its head high above the rest of the Cajon range that bounds the view eastward, or with the apparently flat-topped table mountains that loom to the south in Lower California; the mesa is tolerably high land, and is not level, as any one will find who hotanizes in the barrancos, or stumbles into the dry bed of a stream in the effort to reach a friend's house by walking across lots. Back of the town it rises into quite a hill, and here, say the prophets, and the wise men, and the counsellors (of whom there are no lack), will be the best part of the city.

Back Among the Hills,

Are large ranches, where agriculture in great measure takes the place of fruit growing. In the Cajon valley thousands of acres are sown with grain, interspersed with orchards. Here there is a lack of brackish water. This valley is more than 20 miles away, but is spoken of by the San Dieguenos as close to. In the same way they speak of Campo, and of the Hot Springs (which are said to be really running springs), and of Julian, some 40 miles away. The country is so large, you know, and as the people all keep a huggy or spring-wagon, and apparently spend half their time in driving, 20 miles is a mere bagatelle. I ought to have gone to the Hot Springs—it would have been so curious to see running water in San Diego county. San Diego river runs sometimes. It has evidently, somehow, silted up the northern end of the bay with mud-flats, and evidences of its wild fury can be traced at old San Diego, where the stream washed away its banks close up to the heat garden of that place.

Old San Diego is some few miles from the new town, and the San Diego river-bed stretches beyond the former place. When there is water in it the Indians wash their clothes there—presumably at other seasons said clothes remain unwashed. In the mountains the San Diego river exists, and water can be obtained in the valley, as in the valleys before mentioned, by digging. Like "sullen Mole," it "runneth underneath." The San Diego water works are in this valley, about two miles above the old town. The water is obtained from wells.

Botanical Notes.

Cholla valley is a good place to hotanize in, especially at its upper end, where it has not yet been cultivated. Here five species of cactus can be obtained with little trouble. Four of these are *opuntias*, having cunningly devised barbed spines on branch and fruit; spines that choke where they touch, and are painful. The cholla proper, *O. prolifera*, has cylindrical joints with bunches of small green fruit at their tips, and grows tall; 10 or 12 ft. high or more. *O. Serpentina* has similar but more slender branches; grows nearer the ground, and does not bear its fruit in bunches. *O. occidentalis* and *O. engelmanni* have flat joints of ovoid form, and edible red fruit; that of the former larger than that of the latter. It is a shame to allow so much good fruit to go to waste. They have a very pleasant, sub-acid taste, and make good preserves and good vinegar. The novice who tries to eat one will remember it. I remember it. I peeled the fruit with my knife, and bit at it. Some of the barbed bristles of the skin had been transferred to the pulp by the knife blade, and at once transferred themselves to my tongue and palate. I ate no more that time, but commenced a frantic endeavor to get rid of this little barbed plague,

killed me. Next time I tried the regular fashion. With a bunch of twigs I whipped off every spicule until all was smooth; then I peeled the fruit and ate it in peace. The Indians whip them, then sing them in a fire to make sure, and then peel them. This cultivated *opuntia*, or Indian fig, of the Missions and of some old Californian gardens, was introduced, or rather re-introduced, by the Spaniards. The fruit is yellow, and similar to that of this wild species. I remember once paying six pence for one in Covent Garden market, London, as a curiosity. It is called *tuno*; this olive is the *acetuno*, or oil tuno. Another cactus is commonly called the Turk's head; by hotanists, *echinocactus*. It is simply a green round-topped mass set with long, bent spines, and bearing at the crown, at this season, a bunch of yellow fruits. The only use I ever heard of for it was as a source of Indian fish-hooks. Few of the plants conspicuous here occur round San Francisco, but among those few is the red-berried *Heteromeles arbutifolia*, commonly called holly. Upon the leaves of this plant occur the same, or apparently the same, black mildew or exudation that attacks the oranges, accompanied by the same *coccus*. Two evergreen sumachs, *Rhus laurina*, and *Rhus integrifolia* are common, looking like small oaks, were it not for the flower. A scrub oak and a cherry accompany them.

Another strange plant was first described by Mr. Cleveland, of San Diego. It belongs, like the ceanothi and the so-called coffee tree of the hills near San Francisco, to this huck-toon tribe, but has no leaves, and is entirely a mass of green twigs, each one of which ends in a spine. A singular hush, full of yellow flowers even now, yet bearing at the same time an abundance of seed vessels of an elongated heart-like shape, each containing some 8 or 10 beans, is known as the *Isomeris arborea*, and is the only representative of its family, the Cappariaceae. Artemisia, or sagebrush, and large plants of the labiate or kindred orders which are indiscriminately entitled "wild sage," are common. In some situations a gourd, *Cucurbita perennis*, bearing a round yellow fruit resembling a large orange, is abundant. At first sight I thought the orchardists had been throwing out hushel after hushel of some useless kind of oranges. The root is sometimes used in medicine.

From the few hotanical notes given, it will be seen that this arid region is, even in November, not without enough of plant life to give it interest, and I am told that the few plants, and still fewer flowers, now visible give no idea whatever of the rich luxuriance of blossoms that carpet this now desert-looking mesa after the spring rains. "I thought the flowers beautiful in spring on the hills near San Francisco," said a lady, "but they are nothing in hearty and variety to those found here." So it is no wonder that hees succeed in an almost boundless area covered with flowers in spring, and even in November not absolutely flowerless. No wonder that San Diego reckons honey among her principal exports and her most reliable sources of profit.

W. N. L.

Financial Condition of Mining Companies.

The financial condition of the subjoined mining companies on the first of December was as follows.

Cash on hand.—Con. Virginia, cash, \$36,524; Con. Virginia, unsold bullion, \$85,908.70; California, cash, \$20,227.13; unsold bullion, \$52,005.90; Mexican, cash, \$31,092.93; Contention, \$241,897.86; Standard, \$110,709.90; Bulwer, \$7,523.83; Bodie, \$21,773.62; Mono, \$2,000; Andes, \$20,908.46; Savage, \$20,141.91; Northern Belle, \$176,222.91; Alpha, \$8,962.52; Chollar, \$6,490.19; Silver Hill, \$421.50; Gould & Curry, \$22,466.45; Occidental, \$8,862.60; Exchange, \$16,328.68; Leeds, \$1,098.34; New York, \$7,048.30; North Belle, Isle, \$2,946.62; Navajo, \$197.29; Ward, \$110,477.43; Steep Hollow, \$1,859.06; Mammoth Bar, \$1,809.14; Fresno Enterprise, \$10,919.97; Mt. Potosi, \$1,837.36; Northern King, \$270.94; Tioga, \$6,000; Summit, \$6,500; Double Standard, \$2,393; Hale & Norcross, \$12,392.20; Betty O'Neil, \$134; Mt. Diablo, \$26,279.88; Belding, \$1,554.14; Kentuck, \$5,525.09; Caledonia, \$8,167.68; Watt Blue Gravel, \$915.70; Overman, \$2,890.89; Alta, above liabilities, \$13,393.97; Benton, above liabilities, \$37,564.12; Silver King, \$132,518.67; Tip Top, \$71,388; Justice, \$8,658.29.

The following companies had an indebtedness as follows: Julia, \$30,930; Union Con., \$75,477.03; Bullion, \$251,739.16; South Bodie, \$1,452.14; Black Bear, \$1,433.86; Paradise Valley, \$2,678.73; Lady Washington, \$6,972.32; Bechtel, \$98.97; Sierra Nevada, \$41,632.36; Holmes, \$81; Belmont, \$7,627.77; Scorpion, \$7,590.50; Head Center, \$32,492; Modoc, \$17,715; Day, \$1,433.49; Independence, \$1,530.83; Belle Isle, \$2,709.13; Grand Prize, \$23,407.07; Crown Point, \$5,028.18; Albion, \$8,398.27; Argenta, \$3,152.27; St. Louis, \$360.68; Equator, \$5,081.83; Metallic, \$6,255.21; Best & Belcher, \$14,296.52; Con. Imperial, \$14,612.48; Potosi, \$20,349.43; Chollar, \$2,216.93; Utah, \$23,815.95; Ophir, \$22,407.22.

The total amount of bullion shipped during the past month, by Wells, Fargo & Co.'s agent in Nevada City, amounted to \$106,500.

THE *Bentonian* calls the miners, leaving Bodie and thereabouts, for Arizona, "exodus."

Two Kinds of Mining.

While the future of mining stock speculations and of stock companies is extremely doubtful, that of legitimate mining is not. The reasons are obvious. This form is largely dependent on excitement, on unusual productions, and on the speculative inclinations of the public. The latter is sustained by hard money taken from the ground in paying quantities—by something as substantial as the precious metals themselves. Mining can be carried on without regard to the condition of stock markets, when mineral veins are worked simply for what can be made out of them, and not used as decoys for making money out of the general public.

The enlistment of capital in mining, in opening up new countries or in any profitable or promising undertaking, great or small, is creditable and meritorious to those who engage therein, provided this money so secured is used solely for the best interest of the enterprise in hand. It should be used wisely and carefully, and not wasted in the many foolish schemes that suggest themselves to the minds of inexperienced managers or directors. Money is ostensibly raised for the purpose of bringing a mine into paying condition, or to furnish it with hoisting works or reduction works, or all three, in case they are needed. Consequently, the resources of the company treasury should not be wasted in other ways nor used extravagantly in any quarter. More than this the mine should be developed steadily, and as much as possible for the payment of dividends at regular intervals. It is where the reverse is the case, where a mine's contents are concealed, its stock depressed and discouraged investors led to sell out at low figures, that legitimate mining has no place.

There are many cases where capital is needed in mining enterprises. In one instance it may be absolutely necessary to place a deserted and water filled mine in proper shape. In another its main advantage is in expediting matters, enlarging production and in reducing expenses. Such investments are advantageous and reasonable where the value of the mines have been properly tested. But the mining industry suffers severely from investments made on properties either worthless or of too limited a character to repay the outlays. The East is full of companies organized on such properties, and more propositions of like nature are now awaiting the decision of moneyed men. The main object in such schemes is to stock them as high as possible and sell off the stock before the worthlessness of the mines are ascertained. In this way the original seller and the Eastern operators, who have taken hold of the affair to enrich themselves and rob their neighbors, are enabled to rake in quite a pile of money while the stock investors have only their experience and a lot of worthless certificates to obtain consolation from. Such operations and the conducting of mines in the interest of stock manipulators are continually tearing down the good reputation the mining industry acquires from steady and uniform product, profits or dividends in other quarters.

That mining has been extremely profitable in many localities cannot be disputed. The building up of States and Territories in the Western wilderness within a few short years are evidences of this fact. Gold and silver mines have been found that have enriched men and communities. Large and increasing populations have been sustained from their products, and towns and cities, with all the accompaniments of civilization, have resulted as the natural outgrowth. Many localities can be named where the amount of capital received in a decade or two, or from the time of the first discoveries, has been insignificant, and that applied in so worthless a manner as to be of no benefit. The localities referred to here have grown to their present unflinching producing capacity of millions per annum within a very short period of time. In one case it may be two years, in others 10 and in others twenty. This advance guards who made the first discoveries were, as usual with prospectors, poor in purse. Since then thriving populations have succeeded them, with resources and productions sufficient to induce capitalists to build railways over almost impassable mountains to reach them. In many of these flourishing mountain towns are banks, where the miners' aggregate deposits range from hundreds of thousands of dollars up into the millions—and all accumulated from labor in the mines within 2, 10 or 15 years. More than this, much money is continually being used in prospecting and developing, or in what may be called experimental work, while other sums are sent away to families or friends in the East or in Europe. Such results are evidences of legitimate mining.—N. Y. Indicator.

BISBEE DISTRICT.—There can be no shadow of a doubt of the permanency of Bisbee as a mining camp, and it is having a veritable boom. There are now fully 500 people in the camp. Fifteen or 20 wooden and four adobe buildings are being erected, and there are four restaurants, four stores, two butchering institutes, and this usual number of saloons in full blast. Strange to say, there is no lodging-house as yet, and strangers who have no friends or acquaintances in town have to do some tall skrimishing for a place to lay the head when the shades of night fall. Bisbee is singularly quiet for a new mining camp, which state of affairs is undoubtedly due to the stern justice dispensed

MECHANICAL PROGRESS.

Government Report of the "Anthracite" Trial.

We have already alluded several times and at considerable length to the recent experiment of the little English steamer, *Anthracite*, and to the interest felt therein by mechanics and engineers in this country. The Commission of Engineers of the U. S. Navy, who were appointed to make an experimental trial of her capacities and economies while she was in New York, have just made public their report, the following being the results obtained after a 24-hours' test at the Brooklyn navy yard:

Total quantity of coal consumed.....	4,400
Total quantity of feed water pumped into boiler.....	35,114
Average steam pressure in boiler.....	310½
Average vacuum in the condenser, in inches.....	29½
Average pounds of coal consumed per hour.....	183½
Average pounds of coal consumed per hour per square foot of grate.....	11.98
Average indicated horse power.....	67.7081
Pounds of coal consumed per hour per indicated horse power.....	2.7115
Pounds of feed water consumed per hour per indicated horse power.....	21.63875

The owners of the *Anthracite* had put forward the great economy of fuel possible as the principal advantage of this (the Perkins high pressure) system, claiming that they practically obtained one horse power per pound of coal per hour, whereas about 2½ lbs. of coal per horse power per hour is required in some of the best patterns of marine engines and boilers. The radical change which such success as this would cause in all steam engineering must at once be perceived, and the preliminary trials made in England, as well as the practical demonstration of the system afforded by the voyage across the Atlantic, seemed to bear out the conclusion that something at least approximating to what was claimed for this machinery had been obtained, under circumstances which made the tests substantially complete. But it will be seen that, in this trial, so far from obtaining one horse power per pound of coal per hour, it requires nearly 2½ lbs. of coal per horse power per hour. This result is attributed principally to the fact that the steam pressure was comparatively low, only 316½ lbs. to the inch, while in the trials under the direction of her owners, the steam pressure was maintained at 450 lbs, which high pressure is claimed to be the principal source of economy. Her machinery was, moreover, especially adapted to work constantly at a pressure as high as 500 lbs. without any undue strain or wear. A further explanation of her apparent want of success at the navy yard is found in the fact that Cumberland bituminous coal was used in the trial, while Nixon's steam navigation coal was used in the English tests.

One object of the voyage of the *Anthracite* over here was to test the capacity of her machinery with the employment of different kinds of coal. The furnaces had been theretofore worked principally without any artificial blast, although she is fitted up with a fan blower to be used for obtaining high pressure, or should it be desirable from the nature of the fuel. It was especially intended to experiment with anthracite coal, but it will be readily understood that, in experiments with these different kinds of fuel, extending over only a brief period, the economic results obtained are not to be fairly compared with what might be achieved under a longer experience. No speed trials were made.

It is much to be regretted, in view of the great importance of the matter, that the experiments were not continued long enough, and under the proper conditions to fairly and practically demonstrate whether the Perkins will or will not do what is claimed for it.

HEAT WITHOUT FIRE.—Prof. Wells, of the Massachusetts Institute of Technology, has invented a machine for heating railroad cars without the use of fire. The principle of the machine is friction. It consists only of an iron cylinder two ft. long and one ft. in diameter, having a fixed plate of hardened iron in one end, and a second plate, attached to a revolving shaft, which presses lightly or closely upon the fixed plate, as circumstances require. The cylinder is filled with water, the shaft revolves, and from the friction of the plates, the water in an incredibly short time is heated, and by means of pipes can be carried to great distances for heating purposes. The construction of the machine is such that it is easily adapted to every place where there is waste power, as in mills, factories, public buildings and cars. Thus, to carry a machine with 36 square inches of friction plates—the ordinary size—one-half horse power only is said to be required, while a machine with 225 square inches of friction surface will require only four horse power, and will heat a room 60x200 or 126,000 cubic ft. In steam cars the machine is easily and cheaply adjusted to the axles, the power being taken directly from the wheels, so that in case of accident, all danger from fire is eliminated. This machine has been in practical operation for some months, and it is claimed that with 36 inches of friction surface a room of 10,000 cubic ft. can be heated more uniformly and quicker than by the use of coal, wood or steam, and absolutely without expense save the wear of the friction plates and the pitance for extra coal under the boiler.

The Fluorine Steel Process.

More than 20 years ago Mr. Henry Bessemer started this world with his method of producing steel without fuel, or, rather the use of this carbon in the pig iron as the fuel for its conversion into steel. Mr. James Henderson now proposes to do an equally startling thing in steel making, viz., to make a ton of steel cost less than a ton of the iron from which it is made. His idea is to remove the phosphorus in a merchantable form, and then sell the phosphorus for more than enough to pay the expense of the removal of all the impurities from the pig iron and its conversion into steel. He has recently devised a furnace for the manufacture of steel by his process. The peculiarity of his process consists in the removal of silicon and phosphorus from the iron by the agency of the fluorine in fluorspar. The furnace is an open-hearth with a revolving bottom, similar to the Perot, with the gases generated and burned by a forced blast. The Siemens regenerative system is dispensed with, and instead the heat of the waste gases is utilized in a pre-heating chamber, in steam boilers, and to heat the blast. Mr. Henderson claims that his process will make steel cheaper than the Bessemer.

The lining of the hearth is composed of magnesium lime, which may be applied in the form of dust or fluor mixed with 2% of fluorspar, and he hardened by the heat of the furnace, similar to making a bottom with sand; or they may be mixed with molasses and applied plastic, and is ready for use as soon as it dries. The purest dolomite is preferred for producing the magnesium lime, and if it does not contain 45% of magnesia it will be well to add enough magnesia to give this proportion.

If Mr. Henderson can succeed in removing phosphorus even at double the cost which he estimates, his invention will prove a most valuable boon to the steel industry.

Sensitive Railway Metal.

The accidental displacement of rails is known to be a fruitful source of railway disaster. The rains and floods of winter usually occasion the mischief, but it seems that the "iron horse" has an even more insidious enemy than accumulated storm water to threaten it and to imperil its swift career. The danger in question is one, moreover, that those who can restrict their railway traveling to serene summer time are not exempt from. One day last week an excursion train was jogging on its peaceful way on the Caledonian railway, at the rate, fortunately, of not more than 15 miles an hour, when on approaching Auchinraith, the engine suddenly left the metals, and sliding down an embankment about 10 ft. deep, turned and lay on its side, dragging with it a composite carriage and part of the next one, the remainder keeping their position on the line. The driver and stoker were badly scalded, and several persons more or less shaken, but no lives were lost. Investigation into the cause of the accident showed that the rails, which were of steel, and of the heaviest kind made, had "hugged," owing to the heat of the sun; and further examination disclosed the startling fact that at a point only 40 yards distant from the first disturbance, and on the down line, the rails were bulged 8 inches from their original position, carrying the sleepers with them. The bent rails were preserved for the government inspector, who will, no doubt, give the matter the attention it deserves, especially as regards the quality of the metal of which the rails are composed. There are all manner of new and improved processes for the manufacture of railway running gear, and it may possibly be found that some sorts of steel are more sensitive to solar heat than others. Anyhow, it is to be hoped that the eccentric behavior of the metals at Auchinraith is capable of explanation.—*London Graphic*.

AN ELECTRIC HAMMER.—Messrs. Siemens & Halske, the well-known German electricians, have brought out a novelty, the electric hammer. The device consists of three hollow coils of insulated wire, having a movable core or rod of soft iron, which is free to move up and down under the axial attraction of the coils when a current circulates in them. The central coil is traversed by a constant current, which magnetizes the rod or hammer, and the two extreme coils are traversed by alternating currents from a dynamo-electric machine in such a manner that they alternately attract and repel the magnetic rod up and down so as to make it heat like a hammer. The range of blow is limited on one side by a spiral spring placed within an elastic cushion. Of course a very great rapidity of action can be given to the hammer, while the arrangement is apparently applicable to working a rock drill.

ANTHRACITE ASHES FOR EMERY PURPOSES.—A manufacturer whose business requires the use of large amounts of emery, has been trying an experiment with the ashes of anthracite coal, and affirms that he has got good results from the ashes as a substitute for the finer grades of emery. He took ashes and saturated them with water, the liquid being poured off after standing an hour or two, then being poured off again, and so on until he obtained several grades, down to a substitute for emery flour. When dried the deposit cuts readily and leaves a satisfactory surface. So says the *Coal Trade Journal*.

SCIENTIFIC PROGRESS.

The Utility of Arctic Explorations.

Chas. Walcott Brooks, in his interesting paper on the Arctic regions read before the Academy of Science on Monday last, remarked as follows on the utility of Arctic explorations: To the few who question the value of Arctic voyages, a brief outline of their utility may be needed. Dr. Benjamin Franklin, one of the wisest men born on this continent, was in 1753 one of their earliest advocates. Abroad we have seen British, Germans, Austrians, Swedes, Norwegians and Dutchmen taking part in polar explorations. Their results are very varied. Their constant observations aim at the discovery and seek needed information to aid the correct demonstration of great physical laws, necessary to advance almost every department of science, astronomy, navigation, hydrography, meteorology, including electricity and magnetism. Specimens collected for students of natural history furnish needed data for drawing correct geological analogies. The observed variations in the movement of pendulums within the Arctic circle gauge the extent that the earth is flattened at the poles. Great laws are worldwide, and a knowledge of the whole earth is essential to their perfect understanding. Such knowledge increases the effective powers of man by augmenting his mental resources, and thus accelerates scientific discoveries, useful in arts, agriculture, commerce and manufactures. In the climate and winds of polar regions the world has obtained a partial clue of fundamental laws regulating the motor agents of atmospheric currents, and the equalizing influence of warm, gulf and icy streams, that traverse oceans as arterial rivers. How general will be the benefits bestowed when our national Weather Bureau, assisted by such knowledge, is able to apply wider rules of judgment and more surely predict the probabilities of approaching storms and seasons, one week in advance more certainly than in now ventures to forecast a single day. In Boothia, the two Rosses found the magnetic pole, whose mysterious influence the mariner's compass obeys. The mass of observations collected on all sides of this magnetic pole, have assisted science to perfect our knowledge of the laws of magnetic declination and dip. Providence has peopled these high latitudes with human beings, who winter and summer there, as well as animals on which they subsist. Each successive voyage has swept away some old error, and brought to light new phenomena, tending to advance human knowledge. The problem of a northwest passage around North America is not one of direct utility, although the gain to commerce through such scientific expeditions has doubtless been very great, yet difficult for the masses to always comprehend. Their authentic surveys are valuable to our whaling interests, annually representing many millions. The northeast passage around Asia, accomplished by Nordenskjöld, in 1878-79, promises large rewards to both science and commerce.

DECOMPOSING STEAM IN A GLASS TUBE.—Dr. Leffmann, in the *London Chemical News*, states that, as a lecture experiment, by substituting magnesium for iron the decomposition of steam may be shown in a glass tube. A yard or so of common magnesium ribbon is placed in folds, in a hard glass tube, in such a way that the metal touches the glass in a number of points. One end of the tube is drawn into a pretty wide jet, the other is attached to a flask of water. Steam is produced, and allowed to flow until air is expelled, and the apparatus heated sufficiently to prevent condensation at the mouth of the jet. The metal is then strongly heated at the extreme end. After a few moments it takes fire, burning brilliantly, and the escaping hydrogen may be lighted at the jet. It is best to keep the metal quite hot throughout. The magnesia produced is dense and crisp. It may possibly be partly hydrated, but this has not been determined. The experiment, besides being a striking one, is interesting as showing a body acting as a supporter of combustion, and becoming itself converted into a combustible.

SOMETHING CURIOUS ABOUT GLUCOSE.—A foreign pharmaceutical journal states that it has recently been discovered that a minute fungus, *Mucor circinelloides*, common in horse dung, will cause fermentation in solutions of glucose, while it does not affect that of cane sugar. This fact has been taken advantage of to separate cane sugar from molasses, the glucose undergoing fermentation, and thus allowing the cane sugar to crystallize out.

WHAT IS AGRICULTURAL CHEMISTRY?—Dr. J. H. Gilbert, in his address to the Chemical Section of the British Association, asks this question, and answers it as follows: "It is the chemistry of the atmosphere; the chemistry of the soil; the chemistry of vegetation; and the chemistry of animal life and growth." This is sufficiently comprehensive, but none too much so.

LUNAR GEOLOGY.—J. Landerer has submitted to the Paris Academy a work in which he seeks to determine the lithologic character of our satellite. He thinks that the density of the moon and the angle under which it polarizes the light of the sun are such as to show that the materials of the surface are analogous to those of the siliceous rocks.

New Method of Analyzing Metals.

Perhaps the most important information presented at the late meeting of the National Academy of Science, in New York, was Prof. Wolcott Gibbs' new method of analyzing metals by electrolysis. His plan is to place the metal in solution in a beaker, add pure mercury, and connect the mercury with an electric battery. By the electric action the metal was thrown down upon the mercury and the beaker before-hand, and then after the process to determine the metal by again weighing the vessel and the mercury. This method, he said, was applicable to mercury, tin, cobalt, and other metals. It did not apply to arsenic and antimony. He did not despair of separating potassium and sodium by the process, although his experiments with these metals had not been completely successful.

Prof. Hunt said this process came with the beauty and force of a revelation; its simplicity recommended it. Every chemist would await further developments with great interest. He also asked what battery power was used. Prof. Gibbs said the power of the battery was immaterial, except in point of time. The stronger the power the shorter the time required for the process. With a power equal to a Bunsen battery of 40 or 50 cells he had precipitated 15 grams of zinc from a solution in from 20 to 25 minutes. A battery power of two or three cells would probably precipitate three or four grams of zinc in an hour.

The Photophone in Science.

It was noticed some time since that Prof. Bell, immediately after the first public announcement of his discovery of the photophone, took his departure for Europe, to personally make known his interesting discovery to scientists on the other side of the Atlantic. He has already been heard from. It appears that the Professor and M. Janssen, a well known French scientist, have jointly undertaken a series of interesting researches, in order to apply the photophone to the study of solar physics.

The idea first suggested by Prof. Bell, of employing his new instrument for the transmission of sound by light, is to gain some knowledge of the sounds which accompany the tremendous movements of gaseous and other matter known to take place in the sun. Some direct explorations of the sun's image, conducted at the observatory at Meudon, France, were not very successful, but they held out enough encouragement of ultimate success to induce Profs. Janssen and Bell to persist in their efforts in this direction. M. Janssen thinks a better way would be to pass a succession of solar photographs of the same "spot" before an object-glass, casting conjugate images on the selenium. These photographs would be taken at intervals great enough to give notable variations in the constitution of the spot; and thus would be condensed into a short time, variations which in reality took place too slowly to affect the selenium as they occurred.

DEATH OF A DISTINGUISHED SCIENTIST.—Prof. James Craig Watson, director of the observatory of the State University of Michigan, at Ann Arbor, died recently at the age of 42. Prof. Watson was one of the greatest of American astronomers. He was born of American parents in Elgin county, Canada; graduated at the University of Michigan in 1857, and was elected Professor of Astronomy there in 1859. He wrote a popular treatise on comets, a work on theoretical astronomy, and numerous contributions to scientific journals. He has discovered a good many asteroids, and in 1870 received the astronomical prize from the French Academy of Sciences. Prof. Watson spent some time in this city on his way to and in returning from his trip to Japan to observe, from that point, the transit of Venus, in 1874. At that time his party was unable to accomplish much, on account of bad weather; but he was more successful in a subsequent visit to this coast to observe the last total eclipse of the sun. On that occasion he announced positively that he saw one, if not two, intra-mercurial planets. Prof. Watson was the author of several works on astronomy.

THE GULF STREAM.—At the late meeting of the National Academy of Sciences, in New York, Prof. J. E. Hilgard read a paper on "The Basin of the Gulf of Mexico," in which the theory was stated and endorsed that the so-called gulf stream does not flow from the gulf, as has been represented in the physical geographies, but is an equatorial current which comes through the Caribbean sea from the African coast; is turned northeast upon striking the coast of Yucatan; passes through the straits of Yucatan and Florida, and out into the Atlantic, without really entering the Gulf of Mexico at all. The currents in the gulf are not connected with this great stream, and are very slow.

PHOTOGRAPHS OF THE NEBULA IN ORION.—Prof. Henry Draper has succeeded in obtaining a most accurate photograph of the bright part of the Nebula of Orion, in the vicinity of the trapezium. The photographs show the mottled appearance of this region distinctly. They were taken by the aid of a triple objective of eleven inches aperture made by Alvan Clark and Sons, and corrected especially for the photographic rays. The exposure was for fifty minutes. The Professor promises to publish, at an early date, a detailed description of the negatives.

able of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Nov. 24.	Week Ending Dec. 2.	Week Ending Dec. 9.	Week Ending Dec. 16.
Alpha.	24 2.20	31 2.1	5 4.1	4 3.4
Alta.	4.15	12 3.4	20 8.1	8 3.45
Andes.	90c	80c	85c	3 12.40
Alps.	25c	20c	20c	10 45c
Argenta.	25c	20c	20c	10 45c
Atlantic.	25c	20c	20c	10 45c
Aurora Tunnel.	25c	20c	20c	10 45c
Baltimore Con.	25c	20c	20c	10 45c
Belcher.	25c	20c	20c	10 45c
Belmont.	25c	20c	20c	10 45c
Best & Belcher.	25c	20c	20c	10 45c
Bullion.	1.50	1.20	1.40	1.70
Belle Isle.	75c	50c	60c	35c
Bodie.	5 4.30	42 4.30	54 4.2	62 4.1
Benton.	1.15	95c	1.40	1.15
Bulwer.	1.15	1.10	1.10	1.10
Boyle.	50c	50c	50c	50c
Black Hawk.	35c	45c	40c	20c
Belvidere.	35c	45c	40c	20c
Booker.	50c	50c	50c	50c
Caledonia.	35c	35c	35c	35c
California.	1.70	1.10	1.60	1.70
Challenge.	75c	70c	70c	80c
Chollar.	12 1.15	1.85	32 1.55	2.20
Confidence.	3 1.10	1.05	30c	1.55
Con Imperial.	2.30	2.20	2.10	2.10
Con Virginia.	2.30	2.20	2.10	2.10
Crown Point.	1.30	1.10	1.05	1.10
Con Washoe.	30c	30c	35c	20c
Champion.	30c	30c	35c	20c
Concordia.	30c	30c	35c	20c
Dayton.	30c	30c	35c	20c
DeFrees.	30c	30c	35c	20c
Danby.	30c	30c	35c	20c
Day.	18 1.10	1.10	1.10	1.10
Excelsior.	12 1.05	1.30	1.10	1.10
Endowment.	12 1.05	1.30	1.10	1.10
Gen Thomas.	12 1.05	1.30	1.10	1.10
Grand Prize.	12 1.05	1.30	1.10	1.10
Gila.	12 1.05	1.30	1.10	1.10
Golden Chariot.	12 1.05	1.30	1.10	1.10
Golden Terra.	12 1.05	1.30	1.10	1.10
Goodshaw.	80c	85c	85c	85c
Gould & Curry.	3 3.45	30c	35c	35c
Hale & Norcross.	4.05	3.10	6 4.20	5 4.05
Hillside.	16c	16c	16c	16c
Highbridge.	16c	16c	16c	16c
Homestead.	16c	16c	16c	16c
Hussey.	16c	16c	16c	16c
Independence.	40c	40c	40c	40c
Julia.	40c	25c	35c	25c
Juarez.	1.60	1.10	1.60	3.90
Jackson.	1.60	1.10	1.60	3.90
Joe Schick.	1.60	1.10	1.60	3.90
K K Con.	1.60	1.10	1.60	3.90
Kentuck.	1.60	1.10	1.60	3.90
Kosuth.	1.60	1.10	1.60	3.90
Koyote.	1.60	1.10	1.60	3.90
Lady Bryan.	25c	15c	40c	25c
Lady Wash.	25c	15c	40c	25c
Leopard.	25c	15c	40c	25c
Leviathan.	25c	15c	40c	25c
Lead.	25c	15c	40c	25c
Lee.	25c	15c	40c	25c
May Belle.	25c	15c	40c	25c
Modoc.	25c	15c	40c	25c
Manhattan.	25c	15c	40c	25c
Martin White.	25c	15c	40c	25c
McClinton.	25c	15c	40c	25c
Meadow Valley.	25c	15c	40c	25c
Mexican.	25c	15c	40c	25c
Miles.	25c	15c	40c	25c
Morning Star.	25c	15c	40c	25c
North Con Virginia.	25c	15c	40c	25c
New York.	30c	20c	25c	40c
Northern Belle.	30c	20c	25c	40c
New Coso.	30c	20c	25c	40c
Navajo.	1.10	1.10	1.05	80c
Ocidental.	1.20	1.20	1.10	1.10
Onia.	61 51	62 64	64 64	64 64
Overman.	30c	75c	80c	75c
Panther.	30c	75c	80c	75c
Phenix.	30c	75c	80c	75c
Phil Sheridan.	30c	75c	80c	75c
Potosi.	12 1.00	1.10	1.10	1.10
Prospect.	12 1.00	1.10	1.10	1.10
Raymond & Ely.	12 1.00	1.10	1.10	1.10
Richer.	12 1.00	1.10	1.10	1.10
Rye Patch.	12 1.00	1.10	1.10	1.10
Rough & Ready.	12 1.00	1.10	1.10	1.10
Savage.	2.05	1.10	2 4.20	1.90
Seg Belcher.	5 6	6 6	6 6	6 6
Sierra Nevada.	62 62	62 62	62 62	62 62
Silver Hill.	40c	25c	40c	30c
Silver King.	11 92	11 123	113 14	14
Silver Prize.	11 92	11 123	113 14	14
Sucon.	11 92	11 123	113 14	14
Summit.	11 92	11 123	113 14	14
Scorpion.	11 92	11 123	113 14	14
Solid Silver.	11 92	11 123	113 14	14
South Bodie.	11 92	11 123	113 14	14
South Standard.	11 92	11 123	113 14	14
Star.	11 92	11 123	113 14	14
St. Louis.	11 92	11 123	113 14	14
Syndicate.	11 92	11 123	113 14	14
Thos Con.	11 92	11 123	113 14	14
Tipon.	11 92	11 123	113 14	14
Trojan.	11 92	11 123	113 14	14
Union Con.	11 92	11 123	113 14	14
Utah.	11 92	11 123	113 14	14
Vermont Con.	11 92	11 123	113 14	14
Ward.	11 92	11 123	113 14	14
Wells Fargo.	11 92	11 123	113 14	14
Woodville.	11 92	11 123	113 14	14
White Cloud.	11 92	11 123	113 14	14
Yellow Jacket.	3.90	2.90	3 4.35	3.60

Sales at S. F. Stock Exchange.

Wednesday A.M., Dec. 16.	180 Yellow Jacket. 3.20@3.15
6375 Alta.	400 Argenta. 1.50
1050 Andes.	50 Albion. 1.50
150 B & Belcher.	70 Bulwer. 1.10
600 Belcher.	50 Belle Isle. 1.10
490 Bullion.	270 Bodie. 1.10
3200 Benton.	100 Bechtel. 75@80c
650 Con Virginia.	200 Champion. 25c
20 Con Imperial.	1000 Goodshaw. 85c@1.35
320 Crown Point.	1000 Grand Prize. 1.35
350 California.	1000 Holmes. 1.35
310 Chollar.	350 Jackson. 20@1.15
400 Caledonia.	500 Eureka Con. 1.10
100 Capital.	200 Goodshaw. 85c@1.35
380 Excelsior.	200 Grand Prize. 1.35
340 Gould & Curry.	100 Holmes. 1.35
760 Hale & Nor.	400 Jupiter. 20c
450 Julia.	80 Mono. 1.40@1.30
2010 Justice.	350 Mammoth. 30c
100 Lady Wash.	600 Manzanita. 3.70
195 Mexican.	700 Navajo. 70c
450 New York.	2100 N. Belle Is. 35@40c
600 Overman.	550 Northern. 1.00@1.05
35 Ph.	500 N. Belle Is. 35@40c
390 Potosi.	1.70@1.15
395 Savage.	20 Northern Belle. 85c
290 Sierra Nevada.	70@72 1200 Oro. 45@40c
110 Silver Hill.	20 Silver King. 14@13c
650 Scorpion.	100 S. Belcher. 15@13c
210 Utah.	8 650 Tuscarora. 30c
90 Union.	10@103

The tailing mills of the Comstock have been shut down for the winter. This throws 225 men out of employment. The Chronicle says most of the mills are closed permanently, as the tailings fail to pay expenses.

The Indians around Pioche have all selected the residences in which they intend residing next summer, when the "white man" all go in

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alpha Con M Co	Nevada	13	1 00	Oct 27	Nov 30	Dec 21	Wm Willis	309 Montgomery st
Belcher S M Co	Nevada	25	75	Nov 3	Dec 6	Dec 27	J Crockett	310 Pine st
Belvidere M Co	Cal	9	50	Dec 7	Jan 10	Jan 29	C W Hubbard	310 Pine st
Bechtel M Co	Cal	7	15	Dec 3	Jan 10	Jan 31	W H Lent	309 Montgomery st
Black Hawk G M Co	Cal	10	10	Nov 10	Dec 15	Jan 7	H A Charles	419 California st
Benton Con M Co	Nev	4	60	Oct 27	Nov 30	Dec 20	W Watson	302 Montgomery st
Best & Belcher M Co	Nev	19	60	Nov 5	Dec 10	Dec 31	Wm Willis	309 Montgomery st
Bullion M Co	Nevada	17	25	Dec 14	Jan 17	Feb 7	J M Brazill	328 Montgomery st
Buckeye W & H M Co	Nev	3	2 00	Nov 4	Dec 11	Jan 4	W H Lowden	320 Sansome st
Caledonia M Co	Nev	33	25	Nov 29	Jan 4	Jan 25	R Wegener	414 California st
Con Imperial M Co	Cal	13	10	Nov 3	Dec 8	Dec 29	W B Dean	309 Montgomery st
Chollar M Co	Nev	5	50	Nov 9	Dec 14	Jan 4	W B Dean	309 Montgomery st
Hale & Norcross M Co	Nevada	67	75	Dec 2	Jan 13	Feb 7	J F Lightner	309 Montgomery st
Julia M Co	California	14	30	Dec 15	Jan 20	Feb 1	H A Charles	410 California st
Jackson M Co	Nevada	13	20	Nov 23	Dec 27	Jan 17	O M Shaw	408 California st
Lady Bryan M Co	Nev	5	25	Oct 21	Nov 22	Dec 10	C Van Dyke Hubbard	310 Pine st
Mackay M Co	Nevada	6	25	Nov 23	Dec 30	Jan 24	J M Buffington	309 Montgomery st
Mammoth M Co	Cal	6	25	Nov 3	Dec 6	Jan 3	A W Rose, Jr	302 Montgomery st
Overman M Co	Nevada	48	50	Dec 2	Jan 6	Jan 27	G D Edwards	414 California st
Potosi M Co	Nevada	6	50	Dec 10	Jan 14	Feb 5	W B Dean	309 Montgomery st
Sierra Nevada M Co	Nevada	66	1 00	Nov 11	Dec 16	Jan 4	E L Parke	309 Montgomery st
Real Del Monte M Co	Nev	13	25	Dec 9	Jan 18	Feb 8	S W Dyke Hubbard	310 Pine st
Ocidental Con G M Co	Cal	5	06	Oct 11	Nov 30	Dec 20	T T Smith	412 Montgomery st
Ophir S M Co	Nev	38	1 00	Nov 5	Dec 10	Dec 30	C L McCoy	Nevada Block
Original Gold Hill M Co	Nev	9	10	Nov 29	Jan 5	Jan 24	J M Buffington	309 California st
Pogo M Co	Cal	12	15	Nov 30	Jan 4	Jan 24	W H Lent	309 Montgomery st
Union Con S M Co	Cal	15	1 00	Nov 3	Dec 6	Jan 3	J M Buffington	309 California st
Utah S M Co	Nev	32	2 00	Nov 4	Dec 9	Dec 29	G C Pratt	309 Montgomery st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Argenta M Co	Nevada	6 10	Nov 20	Dec 22	Jan 12	E M Hall	327 Pine
Arizona Prospecting & M Co	Arizona	2 05	Oct 8	Dec 4	Dec 22	O E Travers	331 Montgomery
Armad G & S M Co	Cal	2 02	Oct 21	Nov 30	Dec 20	J E Fields	240 Montgomery
Cabrera M Co	Mexico	2 02	Oct 13	Nov 17	Dec 15	E B Holmes	309 Montgomery
Commonwealth Con M Co	Cal	4 10	Nov 12	Dec 15	Jan 5	Phas A Morse	328 Market
Cumbarland G & S M Co	Arizona	2 30	Oct 27	Nov 30	Dec 24	J H Griffiths	309 Montgomery
Dudley M Co	Cal	11 10	Dec 7	Jan 10	Feb 3	E C Masten	533 Kearny
Eagle S M Co	Cal	15 10	Nov 15	Dec 15	Jan 15	J E Byrne	214 Sansome
El Tesoro M Co	Lower Cal	9 25	Dec 9	Jan 18	Feb 8	W H Chickering	328 Montgomery
May Flower G M Co	Cal	9 10	Nov 11	Dec 14	Dec 31	J Morizo	202 Sansome
Maryland Con G & S M Co	Cal	2 25	Aug 10	Nov 30	Dec 30	E P Farnsworth	310 Pine
Maybell Con M Co	Cal	6 10	Dec 8	Jan 14	Feb 10	V J Taylor	Safe Deposit Bldg
Merchants M Co	Nevada	5 15	Dec 14	Jan 3	Feb 2	S D Rodgers	Safe Deposit Bldg
Murchie M Co	Nevada	4 20	Dec 14	Jan 7	Feb 8	E M Hall	327 Pine
Navajo M Co	Nevada	6 10	Nov 15	Dec 18	Jan 18	Wm Stuart	320 Sansome
Oro M Co	Arizona	1 01	Dec 3	Jan 3	Jan 24	N T Wesser	232 Montgomery
Pioneer Silver Belle M Co	Arizona	9 10	Dec 3	Jan 3	Feb 7	J E Taylor	310 Pine
Placer Hill M Co	Nevada	13 30	Nov 16	Dec 21	Jan 11	W E Dean	309 Montgomery
Tuscarora M & P Co	Nevada	7 16	Oct 30	Dec 4	Dec 27	M E Sperling	309 California
Wide Awake Prospecting M Co	Arizona	11 10	Oct 18	Nov 25	Dec 18	C Hildebrandt	222 Sutter
Wyoming & Dakota W Co	Dakota	3 20	Oct 28	Dec 7	Jan 3	Theo Witmann	404 Montgomery
Windsor M Co	Nev	1 07 1/2	Nov 17	Dec 22	Jan 17	C E Elliott	327 Pine

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Champion M Co	Cal	J Crockett	327 Pine	Special Annual	Dec 22
Gould & Curry M Co	Nevada	H K Durbrow	309 Montgomery	Annual	Dec 20

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Dec 15
Golden Terra M Co	Cal	J K Goodrich	309 Montgomery	25	Sept 21
Grand Prize M Co	Nevada	W H Fields	310 Pine	10	Sept 8
Indian Queen M Co	Cal	Grove Adams	Merchants Ex	10	Oct 25
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine	10	Oct 30
Northern Bell M & M Co	Cal	Wm Willis	309 Montgomery	50	Nov 15
Silver King M Co	Arizona	J Nash	315 California	25	Dec 15
Silver King M Co	Arizona	J Nash	315 California	25	Dec 15
Standard Con M Co (2)	California	Wm Willis	309 Montgomery	75	Nov 15
Western M Co	California	O S Curtis	309 Montgomery	75	Dec 10

The Mining Share Market.

Of course Alta has been the feature of the past week as it was of the previous. Those anxious for a "hoon" in the stock market have anxiously looked forward to a good ore development in this mine, which would "hoost" up the whole line; They were doomed to disappointment. As the vein was approached, danger of water was apprehended, and the apprehensions proved true ones. On the 15th "cross-cut" No. 1 on the 2050 level of Alta struck a flow of water that came with such force that it flooded the level in two hours. A rush of water followed the blast that broke into the edge of the ore body. Nothing could be seen showing the character of the vein, owing to the torrents of water and mud. The donkey pumps are working well, discharging 200 gallons a minute. The management expect to have the water out in about one week. Mining men here think the flood will not last long.

Such was the dispatch sent from Virginia City. Of course it was disastrous to Alta. Whole blocks of stock were thrown onto the market, breaking the stock down to \$4.45. Whether this is part of a "game" or not, of course no one knows. This water business may have been known for several days. The ways of stock operators are so dark that there is no reliance to be placed in what appears to be the case.

Of course, operations at the mine will be delayed. The pumping outfit of Alta is first-rate, and no doubt the mine could be easily freed of water if necessary. But it may suit the managers to keep it flooded for a few days. It will only take a very few more sharp tricks put upon the public to utterly break down all faith in the stock market. There is not very much now, but what remains, will soon be all gone.

The Oregon Railway and Navigation Co., have purchased all that property bounded by Bryant, Brannan, First and Beale streets, San Francisco, for the sum of \$310,000. The company have already commenced operations to improve it and adapt it for their business. The entire district will be laid out for the accommodation of their passenger steamers and for the vessel which will be used in their Seattle trade, as well as for the storage of their coals and all other business in connection therewith.

WILLIAM WILLIS, Secretary of the Northern Belle company, reports that the November shipments from the mine aggregated \$100,402.32. The regular monthly dividend was paid on the 15th. On December

of the stock market, but few are able to incur the heavy expense incident to the erection of pumping machinery.

NEVADA.

GOOD DEVELOPMENT.—Nevada City *Transcript*, Dec. 14: There is now said to be a continuous ledge of pay ore from the 1st to the 9th levels of the Klailung Sun mine, the richest part being found to the east. Since 1867, the mine has yielded nearly \$2,000,000, and has been a steady dividend payer nearly all of that time.

THE V FLUME EXTENSION.—The ditch from Bear Valley to the mill of the V Flume company at the Cascades has been blocked with snow since the late storm, causing a suspension of sawing operations. A force of men have, however, been busily engaged in clearing the ditch, and it was thought that the machinery could be started up again yesterday. There are about 1,200 logs yet uncut that will be disposed of this winter. Under Mr. Dunn's constant personal supervision, the enterprise is proving an encouraging success.

WILL EMPLOY CHINESE MINERS.—The Manzanita mining company, whose hydraulic claim is situated in the northern edge of the city, will soon begin washing. Twenty-five Chinamen will be employed at \$1.30 a day each, and the Mongolian foreman will receive the stupendous salary of \$2 a day, as we are credibly informed. The wages of the white miners in the district range from \$2.50 to \$3 a day, foremen generally get \$3.50 or \$4. At the same time the majority of mining companies say they have learned from experience that, all things considered, white miners are cheaper at \$3 a day than Chinese at \$1. We are sorry that the Manzanita company is of a different opinion.

BEAR VALLEY EXTENSION.—The Nevada mining company, of New York, is actively engaged in making preparations to resume work on the Sheath & Clay quartz mine in this district, which property yielded fabulous dividends a few years ago, but has for some time now been idle. The machinery of the holding works and mill is being reset, and lumber has been delivered with which to make necessary repairs and build a flume.

THE GULCH EXTENSION.—The pump and mill put up by Mr. Gillespie on the Cornish ledge, Gold Butte, are idle on account of the short supply of water being carried by the Idaho ditch at present. As soon as sufficient water can be obtained, work will be resumed in this sterling little mine.

DEADWOOD.—There are about 25 tons of ore on the dump at the Deadwood, and more is being taken out preparatory to a crushing. Most of it is apparently of fair quality, while in some parts of the ledge it is found to be very rich.

GOOD ORE.—The mill at the Yuba mine, in Washington township, is still kept running night and day. The ledge is about 4 ft thick and of medium grade. The ore is worked by the ordinary milling process to within 5% of dry assay. How many other mines on the coast can say much? There used to be a great deal of talk about the difficulty of overcoming the "rebellious" matter in that ledge, but actual experience proves there is nothing rebellious about it.

NEW GRAVEL MINING INCORPORATION.—T. W. Sterling, T. Houston and N. B. Walker, all of New York, have incorporated, under the laws of that State, the Nevada gravel mining company to work the old Herschman by-product mine in the suburbs of this city. They purchased the property last fall from Messrs. Colley, Herdman, Webster and Grover for considerably less than half the amount of the sum for which they have incorporated (\$65,000, divided into 65,000 shares at \$1 each), but have subsequently made some improvements. We understand that Mr. Sterling is expected daily to arrive here from the East and make arrangements to resume work, which was suddenly discontinued last season a few months after the new company came into possession.

THE CONSTITUTION.—Herald, Dec. 11: A rich strike is said to have been made at the Constitution mine, situated near the Le Compton claim, on the south side of Deer creek. The ledge is about 1 ft in thickness, and heavily charged with sulphurates. The rock is very similar to that of the Le Compton. The owners are Messrs. G. G. Allan, G. G. Allen, and G. G. Allen.

THE MURCHIE.—But few men will be employed in the Murchie mine this winter. Work will be confined principally to the new shaft. The company intend sinking 20 ft further, and will open up 2 levels before commencing operation on an extensive scale. Next spring there will be a larger force of men employed at this mine than there has been heretofore.

MOUNT ZION.—Nevada City *Herald*, Dec. 14: N. T. Treweek, one of the owners in the Mount Zion gravel claim, situated near Snow Tent, came down from there yesterday, and reports 4 ft of snow at the mine. He says that he was compelled to discharge all hands, as they had not yet prepared for a winter's siege, and were minus provisions, fuel and timber. The tunnel is now in 2,500 ft. A contract for driving it further has been let to John Dower, who will return to the mine shortly and continue the work. He will be compelled to peek his food in on snow-shoes.

PLACER.

CONTINUES RICH.—Dutch Flat *Forum*, Dec. 11: The Sucker Flat drift mine, near Iowa Hill, in which the rich chunk was found lately, we learn from August Schillbach, the owner, is still continuing its rich yield of old trunks of shelling out a few big pieces every week, besides a tolerably good sprinkling of fine gold, which latter reaches, at times, two ounces a day to the man. This mine is fast coming to the front as one of the first-class drift mines of the State.

THE CONRAD.—We were shown some very fine average ore in the other drift of W. Roberts, taken from the west drift of the Conrad on the 150 level. Some very rich specimen ore is being taken out of this drift, and which is encouraging, the free gold seems more evenly distributed through the ledge than at any former point. This 150 level has been run about 100 ft in all, 75 ft east and 25 ft west. In both extremities the ore body is of a paying character. A crushing of the rock taken out in running the east drift paid \$30 a ton, and for the last 30 ft in the west drift the ore equals the best they have taken out. They are at present driving the west drift ahead, and each it shows more encouraging developments. They have thus far done no stopping, and, consequently, are in a situation to take out a large amount of ore on short notice.

THE REX.—Supt. F. M. Chisholm, of the New Gold Run mine, informs us that the mine has been suspended since Monday, work having been suspended for some 10 days previous on account of the failure of water. The late rain and snowstorm has started enough water to run the mill and work the mine. It is thought a sufficient amount of water will run to keep the mill going all winter.

PLUMAS.

SPANISH PEAK.—Plumas *National*, Dec. 11: Supt. Smith, of the Monte Christo, called on us on Tuesday. He says the storm was terrific up at the mine, and the wind was fairly fearful. The houses are very substantially built, and he would not be worried by a strong enough to blow down the roof. The work in the mine is going on satisfactorily, and the main tunnel is being pushed forward rapidly. The crosscuts and drifts show pay gravel everywhere, and the outlook for the mine being very successful, is every day growing better. The Burleigh drift works to perfection, and adds "shoots" to the progress made in the tunnel, as it fairly "shoots" the big boulders out of the way. The company was very fortunate in not being caught in the snow with their out-door work, and had just fairly completed it when the storm came along, but now, with everything under cover, the work progresses smoothly, and they are in good condition to defy the elements. The Monte Christo will give a good account of itself in the spring.

THE SAVANNOH.—The snowstorm came a little too soon for the improvements and work on this mine, and part of the work had to be stopped for a few days. The timbers for the new mill are framed and ready to put up, and, if the weather is "half-way decent," will soon be in place. They are running 4 tunnels for the ledge, and in tunnel No. 2 they have a fine vein 4 ft wide. When they get tunnel No. 1 to the ledge, they expect to have 1,200 ft

of backs. About 75 men are employed in and around the mine.

THE LORING & LEVITT. claims still continue to yield big pay. The bad weather makes hard work for miners, as well as for all other branches of industry.

SIERRA.

AMERICAN HILL.—Mountain *Messenger*, Dec. 11: The men who were working on the Wilbourn Con. claim have quit for the present, by reason of being nearly out of provisions, and because they have struck a stratum of heavy quartz boulders which will have to be blasted. They think they are near the bedrock and pay dirt. The American Hill company has finished their ditch tunnel, which is 300 ft long. They are now prepared for spring work.

MORRIETOWN.—One hundred and thirty-five men were in the employ of the American company, of Morriestown, last week.

COMPLETED.—The Morriestown company has its ditch completed to Craig's Flume and 2 new monitors in position. They have got their lumber all up the hill, and workmen are now engaged in widening the main ditch. Morriestown is a lively camp just now.

THE BLACK JACK.—Nevada City *Herald*, Dec. 14: Notwithstanding there is 10 ft of snow at the Black Jack mine, in Sierra county, work still progresses. Up till last week the company was employing 20 men, but since the snow storm, some of them were discharged, as work will be confined principally to running the tunnel. The mill has been removed 300 ft further down the hill. The necessary arrangements for a winter's work are complete, and there being a snow-covered 400 ft in length, leading from the boarding-house to the mine, there is little danger of any obstacle in the shape of a snow-slide presenting itself which would interfere with the miners' work.

SISKIYOU.

QUARTZ.—Scott Valley *News*, Dec. 11: Last Sunday a Mexican named Gilmo Brededa was hunting on the west side of Deadwood, about half a mile from the top of the ridge, between Deadwood and Barkhouse. He shot a deer and followed it into a gulch, where it fell, and while doing so he noticed a small piece of quartz on the ground, which was freely sprinkled with gold. A little search resulted in the finding of several more pieces of equally rich float. He carried them home, and the next day, in company with John Armstrong, returned to the place and succeeded in finding the ledge. It is a narrow vein, about 10 inches wide, but is perfectly matted with gold, and is reported to be richer than the Grizzly Gulch ledge. Specimens taken from it bear out this estimate. Eight locations on the ledge have already been made, and all that is in sight or traceable has been cleared.

NEVADA.

WASHOE DISTRICT.

The following statements, dated Dec. 14th, have been filed in the offices of the leading mines:

SIERRA NEVADA.—On the 2300 level the upraise has been advanced 25 ft; total, 349 ft. On the 2500 level the main north drift has been advanced 30 ft; total length, 375 ft. The joint Union Con. crosscut on this level has been advanced 32 ft; total length, 104 ft. During the week 36 tons of ore were extracted, assaying from \$17 to \$20 a ton. The upraise on the drift running from the Union shaft to the Sierra Nevada east was here completed, and all material for the upraise is now conveyed through the drift.

OVERMAN.—Sinking the winze has been discontinued, and we have out a pump and tank station 200 ft below the 1000 level, and have the tank ready to put in. We will begin to-day to open a station in the winze 375 ft below the 1000 level. The incline upraise has been suspended, to allow the water to drain off. The Forman shaft has been sunk and timbered 15 ft; total depth, 1,555 ft.

ALTA.—No. 1 crosscut, 2050 level, has been advanced 32 ft during the past week; total length, 310 ft. About 20 ft further we will reach the ledge at this point. Crosscut No. 2 has been extended 44 ft; total length, 329 ft. The west drift, on the same level, has been carried 32 ft. Later telegraphic news from this mine is given in our "Mining Share Market."

BRISTOL DISTRICT.

BOTTOM DROPPED GET.—Pioche *Record*, Dec. 11: The bottom dropped out of the Day mine 5 days ago and left a hole in the bottom of the winze. A miner working in the bottom of the winze, known as the 460 level, suddenly engaged in picking ore early Tuesday morning, suddenly disappeared, and the bottom of the winze, and dropped the distance of about 100 ft into a large cavity of ore, on the top of which he had unknowingly been working. The miner swears that he fell a distance of 3,000 ft and that it took him an hour and a half to reach the bottom, and that he smelt brimstone on the route. The cave is very large and contains vast quantities of ore. During the week the men have been engaged timbering this portion of the mine and making it safe for them to work in, and they will to-day start in exploring this new discovery. Two assays were made of the ore, one going \$50 and the other \$37 in silver. We understand that the Day Co. are making arrangements with the Bristol & M. Co. to work 100 tons of ore for them. The Bristol Co. agrees to work the ore up to the highest percentage that they are able to, just simply charging for the working of the same. This is the first time that the mine has ever been made in this district. The general rule here with our tunnels and shafts is to have the bottom of the mine produced by custom ore and bring the owner of ores in their debt.

HILLSIDE.—The Hillside furnace fired up Wednesday, and is reported running all right. Martino says Manager Howell offers to let him take out \$30,000 inside of 30 days. They are waiting for the company to redeem its property before the 26th of January, and if it is not redeemed in time, it becomes the private property of Curtis, Howell, Blair and McGee.

COLUMBUS DISTRICT.

BORAX CONTRACT.—True *Finance*, Dec. 11: B. G. Smith, of this place, has entered into a contract with F. M. Whitaker, who is manufacturing borax at the borax marsh between Columbus and Fish Lake valley, to purchase the entire product of the manufactory for the ensuing year. Smith Bros. are the largest producers and dealers in borax in Nevada, and in addition to their already extensive works at the same place, near Marietta, Frank M. Smith has just purchased from W. T. Coleman, of Fish Lake, the Pacific Borax Works, near Columbus. This company owns an immense tract of borax country in and adjoining Columbus, and has large and costly reduction works erected thereon.

EUREKA DISTRICT.

EUREKA CON.—Eureka *Sentinel*, Dec. 12: From all sources we hear the most encouraging reports of the riches of this celebrated mining property. It is now positively stated that the company has a great abundance of high-grade ore continuous from the 500 level down to the 1300 level, and the outlook is bright. When the new experimental shaft is completed, and if it is not now some 700 ft, and the mine is in complete running order, look out for old time \$2 and \$3 dividends.

ENCOURAGING.—The Kemp & Keen series of mines have shown up some excellent deposits of ore in the recent workings, and with present prospects to go on, the owners will proceed to develop the property. Notably prominent and encouraging is the outlook in the Kemp & Keen and the Bourbon mines. The ore uncovered is of the same quality and stamp as that in the Jackson, and there has never been a doubt but that the chambers extended from the Jackson into the Kemp & Keen ground. The owners feel encouraged to go on with developments.

HOMERON MINE.—A. F. Hodgdon came in from Secret Haven yesterday, after men to work on his mine. He reports it rather a hard job to secure men of late. Instead of working on the recent ore body discovered on his property, he is preparing to work the mine systematically, and has started to drift under the last deposit discovered. A GOOD INVENTION.—We are informed that the patent tweezers, which have been introduced into the Atlas fur-

nace by Mr. Henry Allen, have proved satisfactory for the object they were introduced. The surplus production, which extended into the furnace, melted and formed a cement about the end of the tweezer, which the fires of the furnace will long be burning ere the tweezer is touched. By those who know of such matters, it is considered a success, and will prove a great saving to the castings and the furnace through the sides of the furnace which are made for the admission of the tweezers.

PIOCHE DISTRICT.

WORK AT BULLIONVILLE.—Pioche *Record*, Dec. 11: Ben. Hampton, of the firm of Godlie & Hampton, is pushing work ahead on the furnace and concentrating works as rapidly as possible. The tramways are about completed, and the sampling apparatus is in working order, the firm having commenced purchasing and sampling ore. Chlorides obtain money for ore as soon as sampled and assayed. The company has let a number of contracts for charcoal—more than they need—at 20 cents per bushel. The works will be run on a cash basis.

GOING FOR MENDING.—Joe Griffin and Bob Hanley have undertaken the task of opening the drift connecting the Washington & Creole and Mazepa shafts, which was blasted and filled by a set of vandals. They have been working at this for over 2 weeks, and it will take many a hard day's work before the drift is cleared of debris. It is their opinion that after they get into the Mazepa they can make big money, and are holding their breath.

INDEPENDENCE MINE.—The men working in the Independence mine have struck a narrow streak of very rich ore. Although the streak is quite narrow, yet it is so rich that it pays for working it.

ARIZONA.

GRAND CENTRAL.—Arizona *Citizen*, Dec. 11: Mr. E. B. Gage, of the Grand Central, at Tombstone, returned home Monday. In less than 2 months Tombstone will have in Grand Central another great bullion-producing bonanza. The 30-stamp mill, now building, will not have been completed a day too soon. The developments of the mine are such as to warrant a much larger mill. It has proceeded from a mere prospect to a great mine without any flourish of trumpets. The capital invested in its opening has been expended so quietly, yet intelligently, that comparatively little is known by the outside world of the real worth and wealth of the mine.

STRIKE IN GLOBE.—Globe has got it again. This time it was struck in the Globe, which is a claim belonging to the La Salle group. This group is located about one mile from the celebrated Cox & Coplin, and about 2 miles from the Emeline. This time he struck it as rich as could be asked for. The vein on this claim shows a large width on the surface, and the work done before only prospecting a portion of it, and with this in view, Mr. Hise started his work so as to see if the heat ore had been found. This resulted in his finding a pay streak about 3 inches wide where discovered, that is enormously rich.

NEW DISTRICT.—A meeting of miners to organize a new district was held recently. It is called Wrightson district. The boundaries of the new district were defined as follows: Commencing at a point on the Sonora creek which shall be due south of the eastern boundary of the Aztec district, and running north to the eastern line of the said Aztec district, thence north to the northern boundary of the Smith district to its southeast corner; thence southerly to old Camp Crittenden; thence along the Sonora to the place of beginning. It was resolved that the new district be known as the Wrightson. D. W. Lyons was elected Recorder for the district.

GOLD.—A *Citizen* representative, after a visit to the gold camp near Globe, last Saturday, declared his belief that in this district, that section would astonish the world with its production of the precious metals. At that time there were but two mines in the camp upon which work was being actively prosecuted—the Golden Eagle and Townsend. From a private letter received to-day we learn that the first clean-up of the Golden Eagle 10-stamp mill, after a run of 7 weeks—including the many delays in making a thorough examination of the property, and a very considerable amount in silver. The mill is an ordinary silver mill, and is thus enabled to successfully reduce the ore from the start. The neighboring mill, however, the Townsend, was constructed on the old pattern, with the sole view of saving the gold, and, as a consequence, it was found that it does not save within 45% of the value of the ore. It has accordingly been shut down and a contract has been made for its reconstruction on the plan of the Golden Eagle mill, with an addition of 5 more stamps, making it of equal capacity.

PATAGONIA.—It looks very much now as if Patagonia district, to which so many eyes have been turned as a coming great camp, is on the eve of a genuine "boom," and that on the camp's merits. For some days past several of the bonders of the famous Washington "pool" have been making a thorough examination of the property, and the result is a definite conclusion to consummate the sale. On the first of January next another installment of the purchase money, \$30,500, will be paid to the "pool" sellers, and within 90 days a 60-ton smelter will be erected at Luttrell City for treatment of the ores. This is good news for Washington camp and Patagonia, and for this result the people of that district have largely to thank Hon. J. C. Luttrell, to whose indefatigable energy much of it is due. Right on the heels of this intelligence comes the report of a new and most important strike in the Alta, near Harshaw. It consists of an unexpected development of nearly 81 ft of chlorides and horn silver, and it will probably determine the company to erect a mill for the mine instead of a smelter.

IDAHO.

GOOD GRASS.—Idaho *Statesman*, Dec. 11: From the Star mine, situated within two miles of Bellevue in the Wood river country, and owned by D. Falk and A. Wolters, there was recently shipped to Salt Lake City and sold 51-20 tons of ore, the gross value of which was \$1,240.33, or \$24.51 per ton. The lot was sold for \$331.72, which was a net of \$184.50 per ton. The 3rd shipment of ore transported to Salt Lake City, for sampling, commissions, etc., was \$204.33, leaving a net balance on the lot of ore of \$737.34. With the erection of smelters at or near the mines, which will be done next season, there would be a saving of over one-third.

DRIFT CLAIMS.—Pioche *Record*, Dec. 11: Seven drift claims are being worked in Gold Butte. On the Elk creek side a level from 3 claims is accumulating on the dumps, and by washing-up time in the spring a good many thousands of dollars will be represented in the 3 piles. The first drift, and the one working the largest force, is that of Keane & Hall. Adjoining this claim is the "French Co.," and just above this is the claim of John Martini. On the Bear Run side 4 companies—Barker & Cartwright, and 3 Chinese companies—Saw taking out good dirt. It is estimated that the Gold Butte drifts circulate no less than \$150,000 a year.

THE RISING SUN. mine never looked half so well as it does to-day. The west tunnel has been run in 40 ft since Mr. Thurman took hold of it, and the ledge varies from 18 inches to 3 ft in width of splendid rock. The shaft has been sunk 6 ft, and a drift up a fine ledge 15 inches wide. Although it is thought the Rialto Sun is the richest mine as yet in Boise county, Mr. Thurman has 5 men at work.

MONTANA.

LEXINGTON.—Butte *Miner*, Dec. 11: In the Lexington no important changes in the appearance of the ore body have taken place during the past week. The stopes in the drift running west from the 70 level are all in ore of excellent quality, and are producing about 15 tons daily.

AT THE ALTA. everything is running along smoothly. Drifts in all the levels are being pushed vigorously ahead, the quality of the product remaining about the same. The new Moulton shaft is about 10 ft deep, and a windlass is being put up. In excavating for the shaft house some very rich streaks of ore were encountered.

GRASS TO THE BREEZE. In the new machinery of the Magna Charta, the mine is at present idle. An important strike is to be recorded from the new famous Bell. Some exceedingly rich free ore was uncovered. The stopes extending east and west from the bottom of the North Star are yielding an amount of high grade free

ore sufficient to keep the Clipper mill in constant and profitable operation.

THE COLUS. continues to produce almost 40 tons of ore per diem. It is extracted principally from the face and stopes of the east drift, where some very rich copper ore pockets have been opened up.

OPERATIONS continue active on the Stevens, which is yielding an increased amount of free ore. The new shaft is being sunk as expeditiously as possible, and the ore body shows a steady improvement both in quality and width. Several shipments have recently been made to the Dexter mill.

THE NEW GPHR shaft is being sunk on the vein with excellent results. The ore body is improving in richness, and some very high assays have been made during the past week. The north ledge, on which the first shaft was sunk, is expected to come in in the course of a few weeks, so that the ore body will not only be rich, but extensive.

THE PACIFIC is fast building up a reputation as a prolific producer of the precious metal. The stopes in the east 50-ft drift, in excellent shape, and are yielding from 20 to 30 tons daily, enough to keep the stamps of the Silver Bow mill in continuous operation.

MOUNTAIN BOY are producing to the full satisfaction of the owners. In the face of each is a fine body of base ore, which is being extracted, and when the stopes are started a heavy output may be expected.

THE ACQUISITION continues to produce daily from 6 to 10 tons of very high grade rock. In the 82 level, connecting shafts Nos. 1 and 2, the appearance of the ore body remains unchanged. The double compartment shaft is down 45 ft.

ANSELMO.—Things are booming at the Anselmo. The old shaft, upon which sinking has been steadily progressing for several weeks, has attained a depth of 160 ft, and the ore in the bottom opens up in fine shape. In the 100-ft east drift, stoping is being prosecuted and several tons of rich ore is daily hoisted to the surface from that part of the mine. The new shaft, upon which a whim was recently constructed, and which is about 100 ft from the old incline, is down 60 ft on the main ledge, and is producing some of the richest rock yet taken from the young bonanza.

OREGON.

WIND-DAMS TAKEN OUT.—Sentinel, Dec. 8: Thomas Keaton and Lannes Kilpelt have finished taking out their wind-dam on Rogue river near Douda's. We did not learn the amount cleaned up by them. Mr. Keaton will mine on Poorman's creek this winter. The wind-dam on Rogue river, half a mile above Chavner's bridge, run by Chiurman, was also taken out last week. Lumber and other material used in constructing the dams, has all been placed behind the reach of the winter freshets.

BAXTER.—Ore *Advertiser*, Dec. 8: B. W. and Ralph Deane have rented Thomas Chavner's big ditch, and will engage in mining on a larger scale than ever in the Willow Springs district this season. They are now engaged in putting down a new flume. The water of this ditch was formerly controlled by Chiurman.

GALICE CREEK.—Frank Ennis returned from Galice creek the other day, from whom we learn that little rain has as yet fallen in that section. There was about 2 inches of rain, but the head of the ditches of the English and Blue Gravel companies, and two-thirds as much on the diggings. Everybody is ready, and a heavy rain is all that is necessary to set the camp in motion.

ELLIOTT CREEK.—Jacob and Lennes Kilpelt returned from Elliott creek this week, from whom we learn that there is about 1 ft of snow on the ridge. Several of the companies are still engaged in mining, while others have suspended operations for the present. The past season has not been a particularly successful one in that section, but the future promises to be better.

THE MINERS were in high glee last week, supposing that the rain would continue until they had an abundance of water. They were unfortunately disappointed, however. A heavy rain, of Rogue river, was about 2 miles away. They informed us that but little more rain is necessary to enable them to start up their pipe. They use a giant, with which they made a good run last year.

NORRIS.—Keaton & Kilpelt are getting their Poorman's creek property ready for this winter. The miners are generally prepared for water, and are anxious for a war of the elements. Green Broa, at Galice creek, have their smelter in motion, and are grinding in good quality of rock. The Applegate gravel company is now piping, and are running off considerable ground. John Goff, of Grave creek, brought several handsome specimens of quartz, as also some gold dust taken out of his claim, to town the other day.

UTAH.

SILVER REEF BULLION.—Miner, Dec. 8: The hullion shipments from Silver Reef, through Wells, Fargo & Co., for the present year up to date, foot up over \$1,000,000.

NEW MACHINERY.—The Barbee & Walker's advised of the sale of additional pans, which will be set up on arrival, thereby increasing the capacity of the mine to 200 tons per day, and the product proportionally. The Richmond air compressor will arrive in a few days and be set to work immediately on arrival, with which it is proposed to prospect the mine thoroughly. The operations of this drift will be watched with some interest, as, in event of its being a success, as anticipated, it will have the effect of producing more ore with no great increase of expense, and thereby add to the product. There are millions of dollars in low grade ore only awaiting some cheap method of working, and the day must come when those who have held on for the good time coming must be rewarded. A profit of a few dollars per ton would, in the aggregate, amount to a large sum and make this as prosperous a camp as any on the coast. It has the elements of a large degree, and all that is required is machinery, capital and enterprise to accomplish it.

The Garibaldi Mine.

A correspondent sends us the following item: "The Garibaldi mine is situated on the Stanislaus river, one mile from the Sonora stage-road. The property consists of several locations, having a tunnel 150 ft. cross-cutting the main vein, which is 15 to 20 ft. wide, all of pay ore and nearly identical with the Amador mine at Sutter Creek lying between a head-wall of slate and foot-wall of green stone. A drift 140 ft. in length shows the great strength and permanency of the vein. A large portion of the vein carries about say 10% sulphurets, which assay as high as \$245 per ton, and with free gold sufficient to pay cost of extracting and milling. Enough has been reduced in a small mill to establish the fact of a very valuable mine. The owners of these mines have been at work since 1873 opening them with a view to putting up proper milling facilities, but like many others, had more mines than capital. A small five-stamp battery is in place which will reduce but about four tons in 24 hours, while 40 to 50 tons of ore can be extracted daily from the Garibaldi vein alone. They require a 20-stamp mill with three concentrators and supplemental works; then large returns are sure to follow. All mining and milling power can be had free, by utilizing the water flowing past the mine in the Stanislaus river.

Another Common Mold.

In our issue of November 27th we gave an engraving and description of "bread mold," as it appears under the microscope. On this page we give a similar exposition of another mold which is common in household economy, and is frequently associated with the mold we described before. This is also a fungus plant, and is found on bread, on preserved fruit, also on decaying fruit, on cheese and other substances. Its scientific name is *Aspergillus glaucus*, and it is the plant which is generally meant when one speaks of "cheese mold." The well-known student of fungi, Dr. Bary, made a popular demonstration of this mold some years ago, and it is upon his description that we shall chiefly rely in explaining the growth of the plant, as shown in the engraving.

It shows itself to the naked eye as a woolly floccy crust over the substance, first purely white, then gradually covered with little fine glaucous, or dark green dusty heads. It is shown at *a* as it appears to the naked eye. More minute microscopical examination shows that the fungus consists of richly ramified fine filaments, which are partly disseminated in the substratum, and partly raised obliquely over it. They have a cylindrical form with rounded ends, and are divided into long outstretched members, each of which possesses the property which legitimizes it as a vesicle in the ordinary sense of the word; it contains, enclosed within a delicate structureless wall, those bodies which bear the appearance of a finely granulated mucous substance, which is designated by the name of protoplasm, and which either equally fills the cells, or the older the cell the more it is filled with watery cavities called vacuoles.

All parts are at first colorless. The increase in the length of the filaments takes place through the preponderating growth near their points; these continually push forward, and, at a short distance from them, successive new partitions rise up, but at a greater distance, the growth in the length ceases. This kind of growth is called point growth. The twigs and branches spring up as lateral dilatations of the principal filament, which, once designed, enlarges according to the point growth. This point growth of every branch is, to a certain extent, unlimited. The filaments in and on the substratum are the first existing members of the fungus; they continue so long as it vegetates. As the parts which absorb nourishment from and consume the substance, they are called the *mycelium*. Nearly every fungus possesses a mycelium, which, without regard to the specific difference of form and size, especially shows the described nature in its construction and growth.

The superficial threads of the mycelium produce other filaments beside those numerous branches which have been described, and which are the fruit thread (carpophore) or conidia thread. These are on an average thicker than the mycelium threads, and only exceptionally ramified or furnished with partitions; they rise almost perpendicularly in the air, and attain a length of, on an average, one-fiftieth of an inch, but they seldom become longer, and then their growth is at an end. Their free upper end swells in a rounded manner, as shown at *b* and *c*, and from this is produced, on the whole of its upper part, rayed divergent protuberances, which attain an oval form, and a length almost equal to their radius, or, in weaker specimens, the diameter of the rounded head. The rays divergent from protuberances are the direct producers and bearers of the propagating cells, spores, or conidia, and are called sterigmata. Every sterigma at first produces at its point a little round protuberance, which, with a strong narrow basis, rests upon the sterigma. These are filled with protoplasm, swell more and more, and, after some time, separate themselves by a partition from the sterigma into independent cells, spores, or conidia.

The formation of the first spore takes place at the same end of the sterigma, and in the same manner a second follows, then a third, and so on; every one which springs up later pushes its predecessor in the direction of the axis of the sterigma in the same degree in which it grows itself; every successive spore formed from a sterigma remains for a time in a row with one another. Consequently every sterigma bears on its apex a chain of spores, which are so much the older, the farther they stand from the sterigma. The number of links in a chain of spores reaches in normal specimens to ten or more. This growth is shown at *d* highly magnified. All sterigmata spring up at the same time, and keep pace with one another in the formation of the spores. Every spore grows for a time, according to its construction, and at last separates itself from its neighbors. The mass of dismembered spores forms that fine glaucous hue which is mentioned above. The spores, therefore, are articulated in rows, one after the other, from the ends of the sterigmata. The ripe spores, or conidia, are cells of a round or broadly oval form (see *e* in the engraving), filled with a colorless protoplasm, and, if observed separately, is found to be provided with a

Pacific Coast Railroads.

The annual report of the Government Auditor of Railroad Accounts contains the following passages, which are of special interest to the Pacific coast. Concerning the material condition of our principal road, the report says: "While the property of the Central Pacific Railroad Company, as a whole, is in good condition and well maintained, there are some things mentioned by the Government Engineer, which seem to require notice. A good many small girder bridges have their masonry in poor condition, and should be rebuilt. Temporary trestle approaches to bridges in the Sierras should be done away with. The supply of steel rails for renewals on the main line has not kept up the deterioration of the old iron, so that there are a few badly worn pieces. The Engineer considers it important, and with good reason, that switches in the snow galleries, and on all that portion of the road between Rocklin and Truckee, which is about 100 miles in length, should be lighted for night trains. It is recommended that the section for girders for the small spans should be increased as renewals are made, and that truss bridges, as rebuilt, should be designed for heavier loads.

The Floor System for Bridges

On this road is faulty. The ties are too far apart, and are liable to be hunched and short, and generally without guard-rails to prevent a derailed truck from leaving the bridge. Among more noteworthy improvements on the subsidized portion of the road may be mentioned the new car-shops and other buildings at Ogden, Utah, and extensive yard facilities furnished at

daytime. At such points efficient distance signals should be introduced, so that in case of the misplacement of switches ample time would be had in which to stop trains. When it is remembered that during the season of snow it is practically night all of the time in the nearly 40 miles of snow galleries, and the heavy grades and sharp curves are taken into account, the importance of having efficient signals at all switches, day and night, will, I think, be appreciated." Engineer Nichols reports, however, that the Central Pacific track service is the best organized and most efficient that has come under his notice west of the Mississippi river, and compares favorably with any in the country. Auditor French says, regarding the

Southern Pacific Railroad.

The system of short vandyke ditches and culverts adopted by the company to protect its tracks from washouts caused by cloud-hursts in the region of country east of Seven Palms, in southern California, has proved very successful, but no protection has yet been found against the terrible sand-storms to which deserts are subject, nor against the drifts of sand which often hockade the track and interfere with railroad operations. Until Eastern connection is made, the main traffic will be as it has been in the past; that is, dependent upon supplies of machinery and merchandise of the numerous and thriving mining communities of southern Arizona. When Eastern connection is effected, no doubt much of the business from West to East which now passes over the Central and Southern Pacific roads, will be done by the Atchafalpa, Topeka & Santa Fe, which will have the bulk of the mileage, while the Arizona part will have

by the department, and no lands have been withdrawn north of Redding, in California, or south of Roseburg, in Oregon, a distance, probably, of 300 miles. Furthermore, the time for the completion of the roads has expired. The principal business of these roads is the transportation of wheat, flour and wood northward, but the failure of crops in Willamette valley in recent years, and consequent migration, has so reduced their business that it has been quite a difficult matter to earn enough money to keep their property in repair."

In the course of his remarks concerning the

Northern Pacific Railroad Company,

Auditor French says: "A prime necessity, both for the company and for the country through which its railroad has been located in Washington Territory and Oregon, is the immediate construction of its line eastward through the Cascade range, and westward from Ainsworth, down the valley of the Columbia on its south bank to Portland. The line to Ainsworth from Tacoma will open up the lumber country and lands for the use of wheat-growing communities centering at Walla Walla and other points, while the products of that country will find their export on the sound. No railway between the sound and Portland should be permitted to interfere with the construction of both these lines. There will be business for all, and as the company builds its road eastward, with base of supplies at Tacoma, the transportation will always be at hand, and the profit of it, if any, go into their own coffers. That any other policy was adopted, especially such a one as building east from Ainsworth and depending upon navigation of the Columbia river, with its innumerable difficulties and delays, was hardly short of being suicidal, or of placing themselves entirely under the control of a rival company."

Miners' Families and Mining Towns.

"Well I am going to leave you," said an old Comstocker yesterday, as he offered his hand to your correspondent.

"Where are you off to?"

"Down to Arizona."

"For good?"

"If I fall easy I'll stay where I'm put."

I was astonished. He was a man who had hung on to the Comstock through thick and thin since '61. He had for years been the proprietor of a popular saloon and of the leading faro and keno games. He had been an Alderman, and one of the leaders of the Republican Party. His horses have been the fastest, his turnouts the nattiest, and altogether he has been a "prominent citizen."

"Is the Comstock played out?" I asked the departing prominent citizen.

"Yes, for me. There is nothing in the saloon or the games now. The town is gone in."

"How do you account for it? There seems to be a pretty big population."

"Yes; but it ain't the right kind. You see that row of buildings (waving his hand to indicate one side of C street). Well, all them rooms upstairs used to be filled with hoys. Now the boys all have housees back here on the hill—all got wives and children, and don't appear on the turf nights no more. That's good for them, but it's bad for me. Why, if you want to know why the town's gone in, just drop around the schools when the youngsters are being let loose. In the flush old times a young one was a phenomenon here; now there's thousands of 'em. Well, all of them cubs have got to be fed, and the fellows that's got to feed 'em and cloth 'em ain't got any money to throw away. That's good for them, but it's bad for me. As a citizen I am glad of it, of course; but as a matter of business it's just ruin, and I am off for Arizona. It's a new country, and old times come again."

"You'll open a game?"

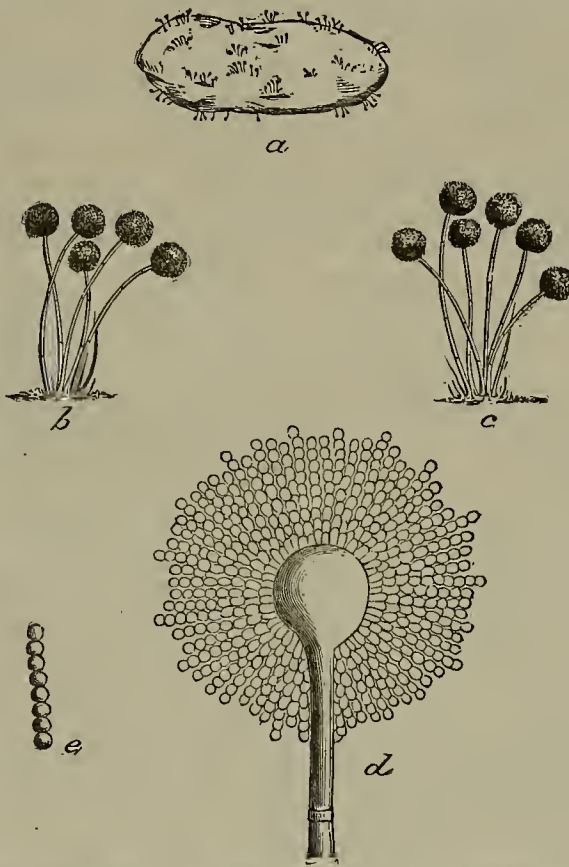
"Of course. That's what I'm after. I'll prospect around and find a camp that isn't too near the railroad, and open a saloon and give 'em a lay-out."

"Why do you want to get away from the railroad?"

"Why? Because when a town is near a railroad it soon gets filled up with dead-horses and etiffs. It's easy to get to and to get from. Men that travel by stage have got to have money, and they're the kind of men that make a camp hum in my line.—Cor. Examiner.

A MILL FOR PAHRANAGAT.—Henry Raymond returned from San Francisco a week ago and has been busy trying to secure machinery, which he has succeeded in doing, for the purpose of erecting a 5-stamp mill in Pahranaagat valley, in the vicinity of the Green Monster and other mining property owned by Harry Henderson & Co. A 5-stamp mill running in Pahranaagat will add a little life to the valley.—Pioche (Nevada) Record.

THE new well at the mill of the Bristol S. M. Co. is a success and contains sufficient water to run the mill. The insufficient supply of water for milling purposes heretofore experienced by this company has been a great detriment, but now everything will work smoothly. This company shipped a bar of hullion Wednesday valued at about \$1,800. The mines at the present time are all yielding a good quantity of fair



THE GREEN MOLD OF FRUIT, CHEESE, ETC.—*Aspergillus glaucus*.

that point, which are spacious and convenient, and the new passenger depot at Sacramento, and also the new freight depot at the same place, and the very extensive renewal of the snow gallery, necessitated by the destructive avalanches of last winter on the unsubsidized portion of the company's property and railroad. The extensive improvement in

Progress at Oakland Wharf

Is worthy of notice—solid and safe embankment of stone and gravel, brought from Alameda; some 75 ft. wide and over a mile long, increasing in width at the terminal point at the bay to 250 ft., with a length of 1,250 ft., and covering an area of about eight acres. It will afford the company permanent and probably ample room for the largely increasing business at that point, and result in great economy as compared with the present piling and wharf arrangements. Of the road (1,204 miles) 462 miles had steel tracks on June 30, 1880.

Signals at Switches.

The remarks of Government Engineer Nichols, above referred to, concerning signals at switches, are as follows: "On no portion of the company's system has the custom been introduced of lighting switches for night trains. I mention this subject not as being peculiar to this road, but in order to call attention to the special importance of both day and night signals at switches on that portion of the line between Sacramento and Truckee, particularly in snow galleries. There are points where the switch stands that are entirely obscured by sheds until the observer is within a few feet of them, so that the

but a small portion over its 200 or 250 miles. This being so, the earnings of leased lines south of Goshen, Cal., as well as those of the main line of the Central and Union Pacific, may be expected with some reason to decrease, unless new business, arising from other sources and from the natural development of the country through which they pass, make up the loss. There can be little question as to the result, the distance from St. Louis to Tucson, via New Mexico, being but 1,675 miles, while by the present roundabout line it is 3,128 miles, and the distance from Chicago to Tucson by the former route will be but 1,832 miles, as against 3,218 miles by the present overland lines.

The report makes the following statement about the

Northern Division

Of the Southern Pacific railroad.

"During the year the company has kept the property in good condition and has acquired possession of the branch road extending from Castroville to Montcrey, at which latter point on the Pacific ocean, a magnificent hotel for summer resort has been built and opened. The business of this road has remained much the same as it was in previous years, California not having, as yet, participated in the increased business activity of the country at large."

Oregon Railroads.

The Auditor says, with reference to the Oregon and California and Oregon Central railroads: "Both of the roads, the one in Oregon and one in California, are unfinished, and owing to the circuitous line proposed in the maps of

New Mexican Burros.

What would the people of New Mexico do without asses! You might as well try to make Ireland do without the pig as New Mexico without the burros. They are our beasts of burden and steady companions. If an excursion into the mountains is planned by Americans, a trip from one place to another or to market town, by the poorer classes of our natives, the gentle donkey has to carry the load. If wood is wanted in the kitchen, or for the fireplace, the burro is called into requisition. The shepherd carries his house, kitchen and store-room on the beast marked with the cross of humility. In the mountain regions the donkey has to take the place of a saddle horse, the cart, or the freight wagon. Meek in deportment, he is sure-footed on the rocky path, and after serving all day under the pack or riding saddle, at night he is turned loose to hunt his daily bread. Unsaddle him and the first thing he will do is to roll over and over on the ground to rub off the sweat; refreshed, he gets on his feet to commence the everlasting bray, and then hunts up his supper and night's lodging. The late discovery of valuable mines in our Territory has created quite a demand for asses in the market, and few, if any, can be procured for less than \$15 a head. Even parties from Leadville, the San Juan region and other mining districts in Colorado, come up to New Mexico to buy burros. Two good packers can manage from 15 to 20 donkeys to bring ore down the side of the mountains, where it would take thousands of dollars to construct a wagon road. The donkeys of New Mexico are tough, hardy and healthy animals, but like all the other native domestic animals here they have degenerated in size on account of too constant breeding in. A number of imported good jacks would almost double the price of these animals, and therefore be a great source of wealth to several of our neighbors in the Red River valley, who are known to possess large herds running loose among the hills and on the prairies.—*Red River Chronicle*

HANDSOME DONATIONS TO COLLEGES.—The following are the gifts which thus far have been made by Mrs. Valeria Stone, of Boston, from the estate left by her husband. Quite a large sum, it is understood, is yet remaining to be distributed, which will be used in accordance with the advice of gentlemen whom the lady has selected as her counselors in the disbursement of this large trust: To Bowdoin College, to finish Memorial hall, \$20,000; to Bowdoin College to endow the Professorship in Intellectual and Moral Philosophy, \$50,000; to the Halliwell class, Yale school, \$10,000; to the Fryburg Academy, Maine, \$10,000; to Dartmouth College to endow a Stone Professorship in Intellectual and Moral Philosophy, \$65,000; to Andover Theological Seminary to endow a Professorship of Relations of Christianity to Secular Science, \$50,000, on condition the subscription be raised to \$100,000; to Phillips Academy, \$100,000, to be used for the completion of the building; to Amherst College to endow a Stone Professorship of Theology, on condition of the college raising \$25,000, \$50,000; to Wellesley College to construct and furnish Stone hall, \$100,000; to the Women's Board of Missions for Harport College, Turkey, \$25,000; to the College of the Young Men's Christian Association, of Boston, to be used toward the completion of their new building, \$25,000; to Hamilton College, Clinton, N. Y., to endow a Professorship of Natural History, \$30,000; to the Chicago Theological Seminary for the Professorship of Pastoral Theology and Special Studies, \$50,000; American Missionary Association, for the institutions at Nashville, Atlanta, Talladega, Longwood and New Orleans, \$15,000; Oberlin College, Ohio, for endowments, \$50,000; Drury College, Springfield, Mo., \$50,000; Iowa College, \$22,000; Carlton College, Northfield, Minn., \$10,000. She has also given \$600,000 to her relatives and friends, and \$100,000 to churches and needy students.

THE MERCED HYDRAULIC MINE.—The *Mariposa Gazette* gives the following items of interest in regard to the works and improvements going on at the Merced river, of the Merced Hydraulic Mining Co., which, in enterprise, is at present engaging more than ordinary attention and interest. The company's works are established at a point on the Merced river, about one mile below the Benton Mills, of the Mariposa Land and Mining Co., and well-known as the "Red Bank," and consists of a complete outfit of first-class machinery. The resources for water-power are very great. At first the machinery was put in motion from a limited supply of water obtained by means of a ditch about two miles in length leading to Scott's gulch. The company is at present engaged in digging a ditch and constructing a large reservoir on Flyaway gulch, about a mile and a half from the works. This, together with the waters of Scott's gulch during the rainy season, will afford a sufficiency of water for the purposes of the company, probably six or eight months. Another permanent source of water of which the company contemplates availing themselves is the construction of a flume about two miles long, to bring the water from the Benton dam.

The hullion shipments from Silver Reef, through Wells, Fargo & Co., for the month of November, aggregated the sum of \$72,996.38.

USEFUL INFORMATION.

An Interesting Experiment.

The New York *Evening Post* gives the following details of a scheme for supplying heat for warming houses and for cooking, which is about to be tried in the district bounded by Fourth and Madison avenues and Fourteenth and Thirty-fourth streets.

From the central station the "plant," or reservoir, the mains will run through every street. One line of iron pipes, from three to six inches in diameter, placed about three ft. below the pavement, packed around with some non-conducting material and inclosed in a wooden box, will be the conducting mains from which the water will be carried by means of smaller iron pipes, one-half an inch to an inch in diameter, into the house. Auxiliary or return pipes of about the same size as the conducting mains, will be laid alongside, through which the water, after it has passed through the houses, will run back to the reservoir.

The water heated in the reservoir to from 350° to 400° Fahrenheit, will be forced out through the conducting mains and through the pipes which connect with the houses, and to each connecting pipe will be attached a water meter. The return pipe will also be provided with a water meter. Each house is to be provided with a steam converter, which in general terms is simply a small metal chamber inclosed in a large metal chamber. The water leaves the reservoir at about 400° Fahrenheit, and as soon as it enters the inner chamber it will form steam, if not confined, 212° Fahrenheit, the boiling point. The chamber is so constructed that a pressure of 10 lbs. will close a valve and shut off the supply of water. The steam will force its way through a valve into the outer chamber, whence it can be conducted through steam pipes to any part of the house and used for heating, cooking, or power, and returned through the auxiliary pipe back to the reservoir.

The steam cooking ovens are coils of pipe through which the steam passes inside of the ovens. Some of the steam will be condensed in the bottom of the converter, and can be drawn off as hot water. The steam made in the converter is of the same temperature as the water from which it came, and hence cooking which requires a heat of from 350° to 400° can be done.

There are about 12,000 houses in the district to be covered first by this system, many of the owners of which, it is said, have consented to have the pipes brought into their houses, and it is to be hoped that about 20% of the buildings in the district will be connected at the outset.

It is remarked that by using beating water less heat is lost by condensation and radiation than in the case of steam, and that the cleanliness and simplicity of the system will commend themselves. It is asserted that any head of steam can be secured, from the fact that a cubic foot of water will make 1,700 cubic ft. of steam. It is estimated that the water which returns to the reservoir will be only three or four degrees cooler than when it started out on its journey. It will be used again, and thus fuel is saved.

POURING OIL ON THE TROUBLED WATERS.—We have several times made allusion in these columns to the use of oil for softening down the violent action of the sea waves. According to the Dundee (Scotland) *Advertiser* some recent experiments were made at Peterhead, and struck the assembled Scotchmen as so successful that the proposal to lay oil on to the mouths of harbors by means of pipes, was discussed as a not very remote project. Bottles filled with oil were sunk to the bottom of the harbor in which the sea was breaking heavily. The oil was then released, and rising to the surface, it exercised an immediate and magical effect in smoothing the troubled waters. Instead of the waves breaking, the sea became quite smooth and glassy-looking, and there was a visible softening down of the waves, which, in place of being sharp and crested, were turned into long, undulating seas.

UTILIZING LEATHER SCRAPS.—A process for making huttons, heels, etc., out of powdered leather has been patented in France. The leather waste which is used, is first freed of all fatty substances by being cleansed and then immersed for an hour in a warm bath having a temperature of about 66° centigrade. Next the leather must be dried in a rotating drum located in a room having also a temperature of 66°. Then it is ground fine or coarse, as desired, after which it is cast into shapes and heated to about 120° centigrade. Then it is finished off by being subjected for 10 minutes to a pressure of from 700 to 800 lbs.

NEW APPLICATION OF MICA.—Mica has been applied to a new use—that of fashioning it into middle soles to boots and shoes. A company has been established in Cincinnati, and the new article is now being supplied to the boot and shoe trade. The invention consists of a sheet of mica imbedded in thin coatings of cement and placed in the hoot or shoe under and adjacent to the insole, the upper leather of the shoe lapping over its edges, or next under the filling, or between the filling and the outer or bottom sole, and covering the upper space from the toe to the instep.

Grape Seed Oil.

We recently made some allusion to an oil obtained from grape seeds as something quite new. But a correspondent of the *Scientific American*, from which journal we gleaned the information, writes that the "alleged discovery" has been known for more than a century. As early as 1770 oil was made from grapo seeds in Italy and France. In 1800 there was a factory at Olhy which had existed from time immemorial. Other factories existed in Bergamo, Italy, in 1770; in Rome and in the vicinity of Ancona before 1782; Naples, 1818; Germany, before 1787.

"In the south of France, where the grape-oil industry is carried on, from 10 % to 15 % of oil is obtained, the oil being better and sweeter than nut oil, and remaining fluid at a lower temperature. It is used in lamps, and gives a bright light, without odor or smoke.

"In extracting the oil from the grape kernels, the refuse left after distilling brandy or making verdigris is dried and ground fine in an ordinary mill, the yield of oil being in direct proportion to the fineness of the grinding.

"Some manufacturers first press without heat, obtaining about five per cent. of oil, afterwards the stuff is heated and pressed with a yield of 10 % or 15 % more oil. The oil is of a light yellow color, and in course of time obtains a density of 0.9202 at 59° Fah., and solidifies at about 3° Fah. M. Laliman erre in recommending this oil for watches, for although it does not congeal as soon as other oils it becomes viscid and rancid when exposed to air. Grape oil saponifies readily, but the soap lacks hardness and density.

"Black grapes contain much more oil than white grapes. The kernels of grapes from vines in full vigor yield more oil than those from very young or very old vines. In France the vines of Roussillon, Aude, and Hérault give the most oil. In general black grapes produce from 15 % to 18 % of oil; white grapes, 10 % to 14 %.

"It is probable that American vines, especially those of California, yield more oil than French vines. In the south of France 25 lbs. of kernels are allowed for 25 gallons of wine. It is easy to estimate the quantity of oil that is annually lost in grape producing countries."

May it not be that there is here a hint for a new and profitable branch of industry that might be successfully introduced into this State?

ENGRAVING HARD METALS.—A French engraver has discovered that the engraving tool will cut into metals which were impenetrable, if the tool is occasionally dipped into petroleum. The hardest steel may be incised easily, if the engraving tool is dipped into a solution of two parts petroleum with one part of terebintine. This may be a new discovery in France, but on this side of the channel a precisely similar process has been practiced for some years.—*Design and Work.*

GOOD HEALTH.

What is a Cold Bath?

The season of the year when very many people who have experienced pleasure and advantage from a daily cold bath have to discontinue the practice, is come. Months will elapse before the return of genial weather will allow of their indulgence in what may be termed man's natural stimulant. Among the young and robust there are a large number who are able to bathe even in the depths of winter; the advantage of so doing is, however, questionable. But let it be once well understood what a cold bath really is, and the course by which we can avoid Scylla and Charybdis will be obvious. A cold bath is not necessarily a bath in water of the temperature of the atmosphere. A bath is truly and really cold when it produces a certain physiological effect—a slight, momentary shock, followed by pleasant and lasting reaction. These effects are for the majority of people most pleasantly obtained by bathing in water about 35° to 40° below the temperature of the body—the usual temperature of unheated water in June and July. Bearing this in mind we can enjoy our physiological "cold" bath as safely and pleasantly at Christmas as at midsummer, and there is no necessity for the most timid or weakly to discontinue his morning tub because the summer weather is over. When the water sinks below a temperature of 60°, let it be heated to that point and then used, and we shall still have our "cold" bath, though of heated water. The daily stimulant effect of such a bath is so beneficial to the great majority of persons and is of such marked service in maintaining health, that it is very important to have it widely known that a cold bath may be taken all the year round, provided cold is not mistaken to mean "at the temperature of the outer air." To bathe our bath during the winter months is too often thought to be unmanly, while in reality it is truly scientific, and to bathe in unheated water all the year round, whatever the temperature that water may be, is to prove one's self an ignorant slave of outward circumstances.—*Lancet.*

Holiday Dinners.

Good Health says: "Friends, these of you who expect to treat your children and relatives or neighbors to a holiday feast, let us give you a hint. Before making preparations for the occasion pause a moment to consider whether it would not be best to deviate a little from the almost universal custom of making our national holidays the occasion for animal gormandizing. Instead of loading the table with articles of food of a character certain to injure the digestive organs, and to work mischief in every part of the vital organism, would it not be better to put upon the table a variety of good, wholesome foods which might be partaken of with impunity, and which will not stimulate the palate to gluttony?"

"Overeating at Thanksgiving, Christmas and New Year's dinners annually causes many cases of sickness and not a few deaths. Doctors are always busy the next day after these holidays, and many generally expect an unusual increase in business.

"Nothing could be more unreasonable than for people who understand the laws of health as relating to diet, to depart on special occasions from the course which their reason leads them to generally pursue, and by their actions, at least, declare to be good and desirable at those special times what at all other times and on all other occasions they pronounce bad and unwholesome."

This is sound advice. Why are all our holidays, days of unreasonable, unnatural feasting? Our women might make a great reform in the world in this respect.

BENEFIT OF LAUGHING.—Dr. Greene, in his "Problem of Health," says there is not the remotest corner or little inlet of the minute blood vessels of the human body that does not feel some wavelet from the convulsion occasioned by good, hearty laughter. The life principle, or the central man, is shaken to its innermost depths, sending new tides of life and strength to the surface, thus materially tending to insure good health to the persons who indulge therein. The blood moves more rapidly, and conveys a different impression to all the organs of the body, as it visits them on that particular mystic journey when the man is laughing, from what it does at other times. For this reason every good, hearty laugh in which a person indulges tends to lengthen his life, conveying as it does, new and distinct stimulus to the vital forces. Doubtless the time will come when physicians, conceding more importance than they now do to influence of the mind upon the vital forces of the body, will make their prescription more with reference to the mind, and less to drugs for the body; and will, in so doing, find the best and most effective method of producing the required effects upon the patient.

SLEEP.—By far the best sleep is obtained at night—nature's chosen period—at a time when all is hushed and favorable to the best repose. The fowls early seek rest, as the sun sinks, and then set us the good example of early rising, with joyous song. Beside the repose and rest of the body, important and absolutely needful changes are effected in the system, while observation and experience prove that sleep obtained by day can never equal that at night. The young, in all of their vivacity and activity, need more sleep, and relatively more food than adults, and females need far more than males, especially mothers. Their labors, toils, cares, anxieties, watchings over their children, their whole round of duties necessarily tax and depress the nervous system, absolutely demanding much sleep—far more than many secure. Of these, those known as the "nervous"—with diseased nerves, exhausted—need the most—all they can secure. Sleep, on an empty stomach, is the best "nervine" for each.

HOW PEOPLE GET SICK.—Eating too much and too fast; swallowing imperfectly masticated food; trying too much fluid at meals; drinking poisonous whisky and other intoxicating drinks; repeatedly using poison as medicines; keeping late hours at night, and sleeping late in the morning; wearing clothing too tight; wearing thin shoes; neglecting to wash the body sufficiently to keep the pores open; exchanging the warm clothes worn in a warm room during the day for costumes and exposure incident to evening parties; compressing the stomach to gratify a vain and foolish passion for dress; keeping up constant excitement; fretting the mind with borrowed troubles; swallowing quack nostrums for every imaginary ill; taking meals at irregular intervals, etc.

HOW TO KILL A TAPEWORM IN AN HOUR.—Dr. Karl Bettelheim, of Vienna, narrates, in the *Deutsches Archiv*, a heroic method and nearly sure cure in the short time of three quarters of an hour to two hours. It is this: He inserts a tube in the esophagus, to the stomach, and pours down from 200 to 400 grams of a very concentrated decoction of pomegranate root, having previously had his patient fast for 24 hours. The worm is stupefied, and passed, head and all, to a certainty; the patient has no sickness of the stomach, and no nauseous swallowing to do.—*Medical and Surgical Reporter.*

It is believed that fat pork produces sorofula, but we do not think that other fats produce it. Indeed, fat in some forms is essential to health.—*Dr. Holbrook.*

MINING SCIENTIFIC PRESS.

W. B. EWER.....A.....SENIOR EDITOR.

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Saturday Morning, Dec. 18, 1880.

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The Week.

Of course the event of the past week has been the splendid rain storm which poured its torrents down to rejoice the heart of the hydraulic miner. This heavy rain brings with it work for both miner and farmer. The last shower previous to this was not enough for the miners. In most places the ground was so dry that the water was mainly absorbed, and as a consequence the flow in the ditches did not amount to much for practical purposes. The ground having been softened, however, the late rain must have set things humming in many places.

A great deal that is of interest to us on this coast is just now under way. The isthmus canal schemes, the various railway projects, the new mining territory of New Mexico, northern Mexico, are all topics of interest to be discussed. Each week we glean from the floating chaff all that is of interest to our readers and present it in as condensed form as possible.

And while writing of this week, we may speak of next week. We intend to present a double-sheet edition fully illustrated, with original engravings, and replete with information of interest and value to the miners, mechanics and other industrial classes of the coast. We are endeavoring continually to improve the PRESS, and next week's issue will be but an example of our efforts.

In a card to the stockholders of the South Bodie mining company, the Board of Trustees explain that the recent assessment of 25c per share was levied to provide funds for the purpose of protecting the valuable works of the

Tailings.

It is only of late that any particular attention has been turned toward the working of tailings from hydraulic mines. It is true that for a number of years it has been supposed that the tailings in many localities would pay to work, but no active steps have been taken to take the matter in hand. A number of projects have been offered to the public, and while there has been more or less talk, there has been no means a proportionate amount of work.

There are numerous localities in California where there are enormous accumulations of tailings from hydraulic mines. It by no means follows, however, that in all of these places can the deposits be worked. It requires an abundance of water, a certain amount of fall, and favorable conditions generally to be able to work such deposits with any degree of success. It by no means follows that because a man has an immense deposit of tailings, he can therefore make money out of them by turning on a stream of water and letting it run. This appears to be the idea of a good many people, and several schemes have been started on this basis.

It must be recollected that in working the original ground by hydraulic, the mines are not always profitable. In fact, there are as many, if not more, chances to be taken in hydraulic mines as in quartz. There are many things to be taken into consideration, and a change in any one of the conditions may cause a loss.

The beds of tailings must be in a position to be readily accessible. There must be plenty of water, plenty of fall, a good chance for dump, and above all, good tailings. The value of tailings is often very much exaggerated, as unfortunate experience has proven in many instances. In figuring up profit, the average value of the whole mess must be considered, as it must all be moved, just the same as the valueless top dirt of the hydraulic banks must be moved.

Just now considerable attention is being paid to tailings. Several Eastern capitalists have become interested, and have taken up propositions to work the deposits in certain districts. It is said also that a number of our well-known San Francisco mining men are quietly at work getting possession of deposits known to be valuable. They may be doing this to sell to the Eastern people, or to others, after the fashion of our capitalists, who generally prefer to let others take the chances of the working operations, unless they can see \$2 in sight for every \$1 put in. However that may be, they are getting hold of the ground.

Among prominent enterprises in this connection now talked of, is the much advertised "Big Bend," on the North Fork of the Feather, 10 miles above Oroville. It is estimated that they will get out \$150,000,000, by cutting an 11,600-ft. tunnel to drain 13 miles of the Horseshoe bend, the whole to cost about \$1,000,000. Eastern people are said to have taken hold of this speculation, but of course no one expects any such Alladin-like results as those set forth. The gravel is from 30 to 50 ft. deep.

The Bear River North Fork Tunnel project is another enterprise long talked of, but which only of late has taken shape. This is a project of running a tunnel through the divide between the North Fork and Bear River, at a point near Cape Horn, for the purpose of affording drainage and fall for working out the accumulations that have gathered in the bed of Bear River from the mine above. The Placer Herald announces that this enterprise has been taken hold of by capitalists who are determined to put it through. From the point where this contemplated tunnel will tap Bear River, up the stream for quite a number of miles to opposite Dutch Flat, on the Placer side, and Little York on the Nevada side, the bed of Bear River is filled from 50 to 150 ft. with tailings from the hydraulic mines, which cannot be washed out for want of fall and dump room. The proposed tunnel is to supply this want. Its construction is a big undertaking and big results are of course expected.

Another project is to hydraulic the tailings in the canyon below Dutch Flat, known as Dutch Flat canyon, where they have been collecting some 20 years. Arrangements are being made by the Cedar Creek ditch company. The *Forum* says this company owns most of the ground on which tailings have accumulated, but will wash over some ground belonging to other parties, they having obtained the right to do so from the owners. A good-sized pipe is being laid over the hill up to near the Dutch Flat station, where it will be supplied with water from the main ditch, and another pipe will be laid from the other, or town side of the canyon. A good head of water will be turned into the canyon as soon as the rains bring enough in the ditches and everything is ready for work.

In all of these enterprises, in which stock is to be held, it is just as well before purchasing for people to inquire pretty closely into the details of the scheme. It is also as well for them to inquire into the professional knowledge of the persons who report on such properties. When such men as A. J. Bowie, Jr., J. D. Hague, Hamilton Smith, Jr., or Joseph McGilvray, prepare a report, we know that their practical experience will have led them to study the project in all its bearings. But it is not every one who is posted on hydraulic mining. Because a man signs himself "M. E.," it by no means follows that his title is clear, or that his

Assays and Mill Returns.

We read in an Arizona paper that a certain mine has on its dump ore that will average \$500 per ton. And also that a lot of 15 tons was carefully sampled by the men who took it out on contract, and found to assay \$900 per ton. But after being run through the mill it did not pay expenses.

This statement will sound curious to those not familiar with mining matters. One man will say that this mill man was a thief. In fact mill men are pretty often called thieves—very often, no doubt, when the fault lies with the miner. Another will say the assayer made a mistake; and yet another that the sampling was not properly done.

The truth of the matter is, as all miners know very well, that assays and mill results differ very materially. People hating mines, don't often hush them on the strength of assays. And people judging of the value of a mine do not base their judgment on assay value of ore alone.

That is they do not do so if they know anything about mining. Assays can, of course, only show results of the particular pieces of rock tested. It is not the fault of the assay if the piece is not an average sample. If a lot of rock is properly sampled, and the assays carefully made, close calculations can be made of its value. But a very great deal depends on the sampling. Sampling is an art in itself. No miner can go on to a dump and pick up a sack of ore and get a fair average. He will unconsciously pick up the best pieces. Some people in getting ore from a dump for sample go so far as to blindfold themselves and they can pick up the ore then without deceiving themselves.

But when comparing assays of stray pieces of ore with mill returns on a lot of the ore from the same mine or dump, it invariably happens that the mill comes out way behind. But the mill ought not always be blamed for this. People in new countries like Arizona and New Mexico are apt to get a good many assays of pieces of ore assaying up into the thousands. But we never hear of any ten or twenty tons milling up into the thousands. If the miners have their profits or values computed from assays they will find themselves very much mistaken.

Men will have assays made of ore which will return, say, \$1,000 per ton. Then they will get out, say, 50 tons of ore, and delude themselves into the belief that this ore is worth almost its assay value. It will be noticed, however, that most of such "mines" will be sold for \$10,000 or \$20,000, even including the 50 tons of \$1,000 ore.

The fact is that this \$1,000 ore is so very exceptional that no sensible man looking for mines ever takes into account the probability of finding any such deposit. Such ore exists in assays but not in mill returns. Whenever we hear of ore assaying \$1,000, \$2,000 and \$3,000, we know the man who selected the ore for assay, did select it, and that is no criterion at all to judge of the value of the ledge in which it was found.

It is generally when camps are first started that such ore is found. We never hear of \$1,000 ore in any old camp with well-developed mines. The mill work takes all the nonsense out of the business. Camps without mills can blow about such rock, but when a mill gets at work on it the poetry of "glittering ore" is displaced by the prose of dollars and cents. The combination of stamps and quicksilver give us the truth about the real value of the rock, and it is on them we must depend for results.

ARCTIC RESEARCH.—The Royal Geographical Society has, after mature deliberation, decided to send out another Arctic expedition next year. It is probable that the route by Franz Josef Land, familiar to readers of the narrative of the Austrian expedition under Weysprecht and Payer, will be adopted rather than that so oft essayed by Smith's Sound. The chief aim of the British expedition of 1881 will be to explore the area north of the 79th and 80th degrees of north latitude. It is certain that the discovery of the north pole is not to be its main object.

An ingenious plan has been devised by the engineer in charge of the projected Market street cable road, for working on the road without interfering with the traffic. A number of bridges in sections of 100 ft. each are being built, and these will be placed over the track while the work is going on underneath. Extensive excavations are being made at the junction of Market and Valencia streets for the engine and car-house.

ANOTHER COLLIERY DISASTER.—Dispatches from Cardiff, on the 10th, gave the news that a great explosion had occurred at Pen y Graig, a new colliery in the Rhonda Valley. The pit is about one mile from the great explosion in the Dinas colliery, in the same valley, January 13, 1878, when about 60 persons lost their lives. This time 87 persons were killed. The shock was felt for miles around.

CHARLES SCHUYLER was killed on the South Fork of Scott river, above Callahan's, last Saturday morning. The tunnel was about 30 ft. under ground and citizens hurried to the rescue, but did not get his body for a few days. He

Manufacturing Towns.

In a recent article we urged the necessity of establishing manufacturing enterprises in the interior towns of California. We have all begun to recognize the fact that California business interests will languish without more home manufactories. With all our producing capacity we do not produce enough. Our raw materials are sold and sent away, but we buy back some of them in this shape of manufactured products. These manufactured products can be made here as well as abroad, but the difficulty is to enlist the services of capital in starting up the proper sort of factories.

And, while we naturally want to see San Francisco grow, we want still more to see California grow. We want to see a number of flourishing manufacturing towns. When these are established the metropolis will be benefited also.

"The population of Massachusetts does not greatly exceed that of Georgia; but in the former State there are 31 cities, each containing more than 10,000 inhabitants, while in Georgia there are only five such towns. This shows what manufactures do toward the building up of towns; and a good supply of towns always makes the farmers laugh, because they afford good markets near at hand."

So says the *Atlanta Constitution*, and very correctly, too. We are just as badly off as Georgia is, as regards large towns. We have only five towns with over 10,000 inhabitants, outside of San Francisco, viz: Los Angeles, Oakland, Sacramento, San Jose and Stockton. Of the towns with over 5,000 and less than 10,000, we may count Bodie, with 7,000 inhabitants; Marysville, 7,000; Santa Rosa, 5,000; Petaluma, 5,000, and Vallejo, 6,000. Of those towns with less than 5,000, but over 3,000, we may count Alameda, 3,000; Chico, 4,000; Colusa, 3,000; Eureka, 4,000; Merced, 3,000; Grase Valley, 4,000; Nevada City, 3,500; Red Bluff, 3,500; San Bernardino, 3,000; Napa, 4,000; San Diego, 3,000; Santa Ana, 3,000; Watsonville, 4,000; Woodland, 4,000. Those with less than 3,000, but over 2,000, are Anaheim, 2,000; Gilroy, 2,500; Healdsburg, 2,500; Hollister, 2,500; Monterey, 2,000; Selinas, 2,500; San Luis Obispo, 2,500; Sonoma, 2,200; Truckee, 2,000; Yreka, 2,000. Those with over 1,000, but less than 2,000, are Antioch, 1,200; Benicia, 1,700; Dutch Flat, 1,500; Folsom, 1,500; Fresno, 1,200; Martinez, 1,500; Riverside, 1,200; St. Helena, 1,300; San Andreas, 1,200; San Rafael, 1,500; Sutter Creek, 1,200; Ukiah, 1,500.

These figures of population we compile from the Pacific Coast Directory for 1880-81, and they may not be exactly correct, in view of the more complete census returns. Nevertheless, they afford sufficient basis for the object of comparison.

We have not in all California one single town devoted exclusively to the manufacture of certain articles. None of our towns are noted for the manufacture of special articles. In fact, we have not got any manufacturing towns. All the places we have mentioned, with local manufactures, could be able to support double and treble their present population. If local capitalists would take the matter in hand, and see what they could do in the premises, they would do the best thing possible for their towns. Certain things could be made more advantageously in one place than another, and the work would be thus divided up.

Certain it is that to establish and maintain prosperous communities in this State, we must manufacture more than we do, and this ought to be done in interior towns. We must lend all our energies to awaken the dormant mechanical skill, arouse the listless capital, and engage the attention of the people in different localities; and above all, we must do something to push the matter on. The subject must not be allowed to rest, but it must be agitated until active steps are taken to accomplish something in the right direction.

THE machinery for a 30-stamp quartz mill, for the State Line Mining Co., in Esmeralda county, is now being taken east by rail to Battle Mountain; thence, by rail to Austin; from which place it will be taken by teams to its destination. It looks somewhat strange to see machinery for southwestern Nevada going east over the Central Pacific railroad, but it appears that it is the easiest and cheapest way to get it to its destination.

TOWN-SITE APPLICATIONS.—Senator Booth has, by request, introduced a bill providing that in all cases of conflict between town-site applications and mining claims, whether lode or placer, the exclusive right to the patent for the land in conflict shall be determined by priority of claim, provided the same is otherwise in accordance with the law.

LIEUT.-GOV. WESTON has given instructions to Manager Gardiner, of the Troy and Greenfield road, to try the experiment of illuminating the Hoosec Tunnel by electricity, with a view of having each illumination permanent, should it prove successful.

PROF. GEORGE DAVIDSON, President of the California Academy of Sciences, has returned from the mountains, where he has been during

Mining Law Amendments.

Already Congress has begun to tinker with the mining laws. It seems as if, of late, as soon as Congress convenes the mining laws come under consideration; and the more they amend them, the more they complicate them. The simpler the mining code of the country, the better for all concerned—except the lawyers. If the laws are amended, altered and fixed over and over again, a lawyer's services are required to interpret them.

This ought not to be so. The mining laws should be so simple that any miner could construe them without doubt. The way some of the amendments have been put through has been very careless. The wording has been such that it was liable to two or three constructions, involving a great deal of misunderstanding and confusion. Most of the members of Congress from this coast have not been men who knew much about mining matters, and those who did, never manifested any great desire to thoroughly sift out the needs of the mining community.

It is probable that now, since so many Eastern people have gone into mining, some of them will come out as experts in this line and show their wisdom in drafting laws for the miners. The attempt made at the last session, however, were not very successful. Making laws applicable to only one district, but designed to cover all, was not exactly the thing for a first attempt.

The law of May 10, 1872, was and is a very good one. It has now become pretty well understood by the miners, and the fewer changes we have, the better will the miners like it. The proposed change to which we refer is a bill introduced this week by Senator Teller, which provides that any person owning six or any less number of mineral lode, ledge or "blanket" claims adjacent to each other, or not more than half a mile apart, on which the assessment labor for the first year has been performed, may thereafter perform upon any one claim of the combined number, the entire assessment labor due upon the whole number of claims. If pay mineral is reached on the claims worked, it shall then cease to be counted as one of the combination, and another shall be selected on which to work the assessment of the remainder, and so on, until pay mineral is reached, or all the ground abandoned. The bill also provides that mining claims located since the 10th of May, 1872, whether located by one or more persons, shall not exceed 1,500 ft. in length along the vein or lode; and that no claim shall extend more than 300 ft. on each side of the middle of the lode or location at the surface.

We reserve comments on this proposed measure for a future occasion. Meantime we would be pleased to hear mining men give their views on the matter, for it is only by a fair discussion of the merits of such amendments to the mining laws that anything of lasting benefit can be had. In a multitude of counsel there is wisdom.

The Economist Planer and Matcher.

The accompanying illustration represents one of Frank & Co.'s light planer and matchers. There has been a call among smaller shops of interior towns for a machine at a low price, that would answer the purpose of both surfacer and rustie or flooring machine. This machine not only does that work, but is also adapted for making light mouldings.

This machine has been built with a view of making it as cheap as possible, and yet to do good work. Has a heading attachment and will stick rustic and light mouldings. The cutter-head is stationary—the box being cast on the frame. The bed lowers from the head. The matcher spindle is attached to arms cast on to bed, and raise and lower with it. The spindles are easily lowered for surfacing. The machine has a good and reliable feed. Two sizes are built, to plane 20 and 24 inches, and to match 13 and 18 inches, respectively.

These machines are sold about as cheap as an ordinary small surface-planer. The Berry & Place Machinery Company have them on hand at their store, 323 Market street, and will be pleased to furnish price or any other information desired.

THE Catalpa mine, which adjoins the Evening Star mine at Leadville, Colorado, has declared its first dividend of 20 cents per share, aggregating \$60,000, payable at New York on the 15th inst. It is expected that \$40,000 will be carried over after deducting enough to pay the dividend.

STATISTICS of 64 railroads gathered by the Chicago Railway Age, show that they have already added 335 locomotives and 24,175 cars to their equipment this year, and the Age estimates that all the roads have required 1,595 new locomotives and 68,420 cars worth \$65,679,920 altogether, besides laying \$71,146,000 worth of new ties and rails.

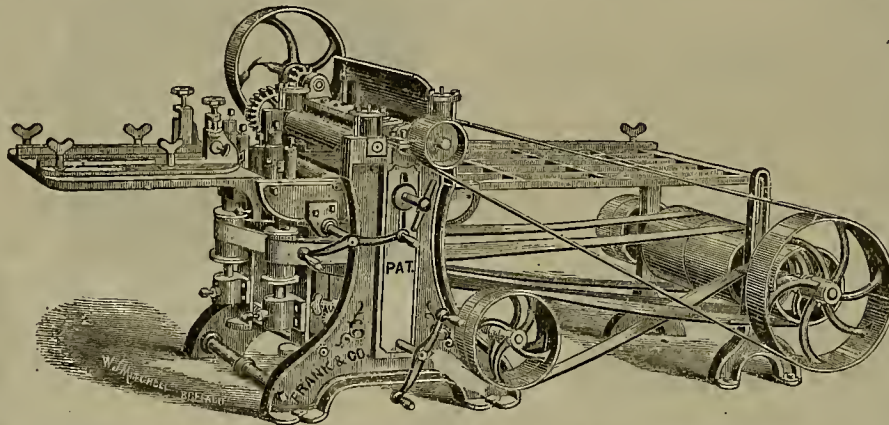
Work Your Own Claim.

We recently took occasion to note the results of work of a number of miners in this State, who had returned to an almost abandoned district, taken up their picks and shovels, and worked out its and their own salvation. They gave up waiting for capital, and went in to make something for themselves. And they did it, and are doing it still.

The example, though by no means isolated, is not so general as it might be. We would like to see more of just such occurrences. Miners are too apt to tarry round the big camp, expecting to be lifted on a "boom." After working for big companies, they seem to hesitate about going in for themselves, as if they were afraid of dropping back a peg. Some of them are probably like the fellow the Nevada Transcript told about the other day, who worked in a mine for two dollars and a half a day. He came to town the other night, got drunk and was sentenced to pay a fine of \$20 or to go to jail for five days. When his term was out he was so stuck up because the judge had allowed him four dollars a day, that he would not go to work in the mine again at the old price.

But really, there are many districts in California and elsewhere, which would afford a good living to miners if they would pitch in for themselves and not look for too big things. It is by no means the very rich rock that pays. Thousand dollar rock is only seen in cabinets and assay offices. It is never seen in mines. Nobody ever hears of it in mills, though there is plenty in newspapers, especially those in new districts. Ordinary rock worth from \$15 to \$30 a ton will pay well according to the locality. Of course, most of our rock in this State will not run as high as that.

Another example of what prospectors can get when they work at their claims, is shown in the



THE ECONOMIST PLANER AND MATCHER.

mill returns of the Pugh mill at Ophir, in Placer county. The Placer Herald obtained from the mill owners a report of the rock crushed during the current year, which shows a very high average. The Herald says: "This mill runs entirely on custom ore, and consequently its crushings include rock from nearly every ledge, not provided with works of its own, in this part of the country. Among the many, of course, the yield of some is low, but from the average we get an idea of how well prospecting pays in this section of the country. During the year just closed there was crushed at this mill 1,774 tons of ore, and the yield from that many tons was 2,230 3/4 oz. and 4 1/2 pwt. Rating this gold at \$14 50 per oz., which is a low average, the yield from the above amount of rock is worth in round numbers \$32,335, or \$18.25 per ton. This is the report only of one mill, but it is fair to presume the return of rock crushed at other mills would not reduce the average. When prospectors realize \$18.25 per ton from all the rock taken out in the course of the year, it can readily be seen that prospecting is not a bad business. Few districts in the State, however, we believe, can make as good a showing."

THE PATRONS OF THE PRESS.—An agent of the PRESS who is now in the field and thus forming the personal acquaintance of our circle of readers, writes as follows in a private letter to our publishers: "It has been my province to have had considerable to do with journalism and the business department thereof in the East, and I take occasion to state that a more desirable class of subscribers and patrons of journalism I have never met with than those I find on your list." We believe our agent is right. Our own experience approves his conclusion.

THE TEACUP MILL.—The Teacup Co., at Cherry Creek, has let the contract to build a 10-stamp mill to reduce the ore at that mine. The contractors are under bonds to complete the work by January 1st. When the mill is completed ore crushing will commence immediately, the company having enough on the dump to keep the mill running for some time.

It is estimated that 25,000 colonists have entered Indian Territory.

Reduction Works for Low Grade Ores.

The means of profitably working low grade ores is the problem which mining men are daily meeting. Of course, so much depends on the class of ore that no general answer can be given to the question, nor is it expected. But the difficulty is to get a satisfactory solution in the case of any low-grade ores. Then again, what are low-grade ores in one locality are not considered so in another. In some places where fuel is scarce, transportation difficult, labor high and living expensive ore could not be worked profitably, which would, in other places, where more favorable conditions existed, be considered first-class ores. In California our main problem is the economical working of low-grade gold ores, but more particularly sulphureted ores. In Nevada, our nearest neighbor, they have long been wrestling with the question of how to utilize their "robbilious" ores, particularly those on the Comstock and vicinity. There are a number of mines in Florsy district that show large lodes of argentiferous galena. There are good smelting ores west of Silver City, alongside the Virginia & Truckee R. R. Carson City is the center of an extended section from which low-grade ores can be shipped, and a great deal of talk has of late been made about putting up smelting works there. A committee of citizens was appointed to consider the advisability of erecting a first-class smelting furnace. They invited all owners of rebellious ores to forward samples of 200 lbs. each of the varieties of ore in their mines, together with a statement of the amount of each kind their mines were likely to furnish. Several meetings of the citizens' committee have been held. G. W. Jones, mining engineer and metallurgist, at present in the employ of the Isabella mining company, was before the committee, says the Appeal, and gave valuable and full information as to the cost of smelting lead ores and concentrating and leach-

Customs of the Comstock.

The hearing of the case of Burks vs. Flood, et. al., is going on in Department No. 2, of the Superior Court, in this city. During the progress of the trial many interesting little facts crop out, which, though well understood and known by those familiar with mining practices here, are not so well understood by the general public. William Stewart, formerly United States Senator from Nevada, testifies that in the early days of the Comstock lode, owners dealt in feet—so many feet of a mining claim, instead of so many shares, but subsequently the dealings in feet and conveyances accumulated to such an extent that owners of claims were induced to incorporate and turn their feet into shares; stock was issued at once where titles were clear; when doubtful, they were investigated, and as soon as cleared up, the stock was issued; a large business grew up in investigating titles, and the searches and investigations in some cases—for instance the Yellow Jacket mine—filled several large volumes.

Solomon Haydenfeldt, legal adviser of the Consolidated Virginia Mining Co., at the time of the transactions complained of, and occupying the same capacity now, testifies this week that it was not the custom on the Comstock to pay money for mining ground, for the reason that money for carrying on the work was at the time of these transactions generally raised by assessment, and any money paid out for ground would to that extent diminish the fund available for working the mine; it was desired to get the stock out so as to make it assessable and increase the working capital or funds; at the time of the purchase of the Kinney ground there were serious hazards about such purchases; there was no certainty of profit; the sales of stock in the stock board here were not very reliable indications of the actual value of mining ground; in the case of well developed mines, which have paid steadily for a long time, the board sales may be a fair criterion, but with new mines the fluctuations are no guide to the value of mining ground; these values were merely speculative; there were tricks and devices by which to elevate and depress the price of stocks. Stock in the Con. Virginia Co. was always issued to holders of interests in the 1,160 ft. comprised in that mining claim; the deed of the Kinney ground to witness expressed a consideration of \$1,200; there was no concealment of the fact that Flood was the purchaser of the ground, and Flood offered at the next ensuing meeting of the Directors, to convey the ground for the stock; there was no concealment in respect of the purchase of any of the interests referred to in the complaint. On cross-examination, witness stated that there was no general meeting of stockholders in the Con. Virginia Co. in 1872, subsequent to the purchase of the Kinney ground; at the annual meeting of stockholders in January, 1873, there was no reference to the purchases of these titles, nor to the issuance of stock for them, nor was anything said about them at any subsequent annual meeting; there was nothing on the books to show what Flood paid for outstanding claims, for such a statement would have no business there; these matters were well known to the Trustees and Secretary, and were talked about as a matter of general knowledge.

Mr. Haydenfeldt has probably as much knowledge of mining transactions as any man on this coast. His statement with relation to the value of stock and value of the mine itself should be remembered. The facts are as much facts now as then. The quoted value of the stock by no means gives any idea of the value of the mine. A good many of our best mines never have any stock quoted, while a great many of the poor ones have their stock continually quoted. As matters are nowadays with the Comstock without bonanzas and the stock market without buyers, the customs of stock sharps and mining sharps are not of so much importance as formerly, but still a record of their proceedings will serve as experience for others.

COPPER SMELTING.—The Lyon County Times says: "There is a likelihood that at least one man who has stood by his mine for many years, and despite many discouraging circumstances, is about to be rewarded for his perseverance. John Ludwig, the owner of the Ludwig & Carter copper mine, in the Walker River country, has succeeded in inducing capitalists to assist him in developing the property. He is erecting a furnace at his mine, and if the ore proves to be good for smelting he will keep the furnace running steadily, as he has between 3,000 and 4,000 tons of ore on the dump and quite as much more in the mine. The Ludwig (or Ludwig & Carter) mine has been worked for a number of years, and although none but the best of ore—that carrying at least 15 units of copper to the ton—could be freighted to Dayton and sold at a profit, yet the mine has always been self-sustaining. If the furnace now being erected works satisfactorily many others will doubtless soon be erected in the vicinity, as there are several good copper mines there, the ore of which, while it will not pay for mining, sorting, hauling and reducing in Dayton, would pay handsomely if worked on the spot."

ing base ores. The entire cost of such works was estimated to reach \$30,000; an additional reserve fund for the purchase of ore, etc., to keep the works running, and it is estimated that this fund should be \$30,000 to \$50,000. These works would reduce from 30 to 40 tons of ore per 24 hours, and would save gold, silver, copper and lead. A meeting of the committee was held last Saturday evening, and the following resolutions were passed:

WHEREAS, The rebellious ores of Nevada require scientific and practical experience and appropriate process to make them yield their value, and

WHEREAS, Such ores, if properly and scientifically treated, would secure to the State a prosperous future, and yield to the commerce of the world the large wealth contained therein, therefore,

Resolved, That reduction works, known as the Nevada Reduction Works, be erected.

Resolved, That their location and place of business be at Carson City, Nevada.

Resolved, That stock be issued to the amount of 100,000 shares, at the par value of \$1 per share for the purpose of securing and supplying the necessary funds to defray the expenses of constructing such works and as a reserve fund to purchase ores and supplies.

Resolved, That books be at once opened for subscriptions for stock, and that subscribers for stock be required to deposit 5% of their subscriptions, so that any part thereof may be used for the purpose of defraying the expense of preliminary investigations.

Resolved, That Messrs. Bryant & Bence be a committee to furnish such books and the necessary documents belonging thereto.

Resolved, That the bank of Wells, Fargo & Co., of Carson City, be elected Treasurer of the Nevada Reduction Works.

THE EXPLOSIONS in the Stellarton mine, Halifax, continue. No lives were lost. The shaft got on fire, and the latest explosions, on the 14th, destroyed all hope of opening the mines and resuming work. The miners are gloomy and disconsolate.

THE Ventura Free Press says: The well of the Los Angeles Oil Co., at the Sepe is yielding 50 barrels per day of fine green oil. The company intend to put down several more wells in the spring.

The Effects of Patents on Capital and Labor.

In the Economy and Trade Department a paper was read by Mr. John Standfield, of London, on "The Effects of Patents on Science, Capital, and Labor." The writer asserts that the three things which most require protection were science, capital, and labor. It was evidently our interest, he submitted, to afford inventors all the scope we possibly could, so that our trade and income might increase and our expenditure diminish. Contending that we had legislated so badly with regard to the development of science, and the value of both capital and labor had been kept considerably below what it would otherwise have been, he remarked that the prosperity of a nation depended upon its scientific progress—using these words in a wide sense to embrace all discoveries and improvements in our numerous and varied industries—that scientific progress, in its turn, depended upon invention, and that the inventions of a nation were practically dependent upon its patent law. This was, perhaps, more particularly the case in this country than in any other. In the United States, a patent was granted for 17 years, after careful examination by experts, for the small sum of £7; whereas a patent in this country was hurried with the heavy stamp duties of £175 and was not subject to any examination. This enormous difference handicapped the British inventor by 25 to one in favor of the American, and thus, taking the average of the last 10 years, there were 13,356 patents granted to the United States against 3,039 in this country. Mr. Standfield accordingly proposed that our stamp duties should be so reduced that a patent in this country could be obtained as cheaply as in America. His proposal was to charge a stamp duty of £2 on application of a patent, and a further duty of £3 when the patent is granted, and an annual stamp duty of £1, £2, or even £3, so that the Patent Office may be more than self-supporting. He also proposed that patents should last 21 years, including provisional protection for one year. Mr. E. J. Waterson also condemned the present state of the English patent law, and urged the necessity of appointing a Minister of Commerce. Mr. R. A. Macfie opposed licence only for patents, on the ground that it granted a monopoly. Prof. Heinemann said he was opposed to the abolition of patent duty, as it would discourage invention. Mr. Westgarth (London), thought the patent duties were the greatest possible stimulus to invention. Mr. Rendall (Leith) remarked that this was a country of monopolies, as was proved by the existing patent laws.

THE DEBRIS DAMS.—The people in the mountain ains above and in the valleys below the debris dams on the Yuba and Bear rivers are feeling a good deal of interest as to how far these works will subserve the purpose of their construction now that the storms of winter are about putting their strength and capacity to a test. It was fortunate that the dry season was so prolonged, as it enabled the contractors to hring their work to completion before any rains came to add to the volume of water in the streams; and equally as fortunate was the fact that the late storm, although very severe, came principally in the form of snow in the mountains, and prevented an extraordinary rush of water to the rivers, so that the dams were not put to the ordeal of resisting a flood before the sands had filled up the interstices of the brush that constitute the hodies of these constructions. So far everything has been favorable for the dams being solidified by the debris that is gradually accumulating in and above them, so that there is reason to hope that by the time high water does prevail the dams will have so filled that all danger will have passed of their being injured by the pressure or force of the flood. The general opinion among miners who have experience in damming the mountain rivers is that the new dams will stand; and the next point is whether they will so far check the flow of debris that the water will be sufficiently cleared as to be able to scour out the deposits in the beds of the rivers below.—*Grass Valley Union.*

ELECTRIC LIGHT IN A QUARTZ MILL.—The Butte (Montana) *Miner* says: On Monday evening the city council and city officials, together with a large number of other citizens, some accompanied by ladies, visited the Alice mills to witness the operation of the electric light. Notwithstanding a violent snow-storm was raging, the entire party was treated to a most beautiful sight as they approached Walkerville. On top of the hoisting works appeared a light, which in the escaping steam, seemed like a ball of fire rolling in the heavens, while through the windows of the mill the light shone beautifully distinct and cheerful. The party was met by Mr. Ruthrauff, who escorted them through the mills, showing the operation of the lights and explaining how the electricity was generated and manipulated. All remarked on the great steadiness and beauty of the light, and all pronounced it an entire success. The members of the council particularly were unanimous in expressing their satisfaction with the power and brilliancy of the light, and Mayor Valiton says will probably report unanimously in favor of its adoption by the city. The lights are now being run at the Alice all night with perfect success.

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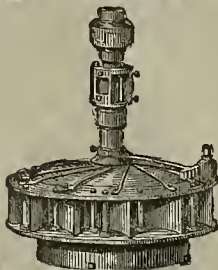
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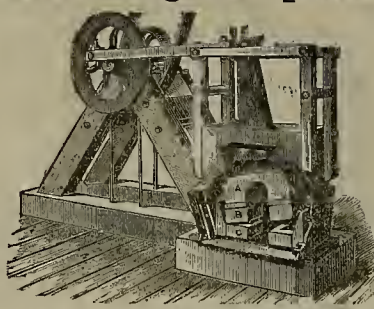
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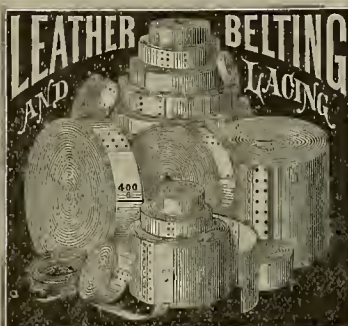
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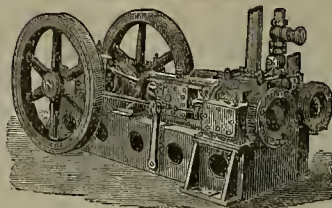


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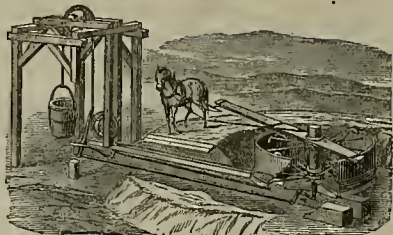
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This House is especially designed as a comfortable home for gentlemen and ladies visiting the city from the interior. No dark rooms. Gas and running water in each room. The floors are covered with body Brussels carpet, and all of the furniture is made of solid black walnut. Each bed has a spring mattress, with an additional hair top mattress, making them the most luxurious and healthy beds in the world. Ladies wishing to cook for themselves or families, are allowed the free use of a large public kitchen and dining room, with dishes. Servants wash the dishes and keep up a constant fire from 6 A. M. to 7 P. M. Hot and cold baths, a large parlor and reading room, containing a Grand Piano—all free to guests. Price single rooms per night, 50 cts.; per week, from \$2.50 upwards.

R. HUGHES, Proprietor.

At Market Street Ferry, take Omnibus line of street cars to corner Third and Howard.

DODGE'S**UNEQUALLED****Concentrating Machinery**

FOR CONCENTRATING GOLD, SILVER,
LEAD and COPPER ORES.

Furnaces for Roasting and Chloridizing Ores, for Amalgamation or Leaching.
Plans, Drawings and Estimates for Working Ores by any Process.

M. B. DODGE,

143 Fremont Street - S. F.

Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.

PACIFIC POWER CO.

Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

Well Tested Mining Devices.

GRATE BARS—Hydraulic. A saving of about half the usual expense. GROOVED RIFLES—Hydraulic. Will largely increase the yield of gold. Concentrators No. 1 and 2. Former without machinery. Latter for fine Gold, Sulphurets or Black Sand. BRYAN TYSON, Patentee. Manufactured by Rankin & Co., Pacific Iron Works.

PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING DECEMBER 7TH, 1880.
235,060—AXLE NOT—Henry Anderson, S. F.
235,121—HOISTING SYSTEM—Z. Blanchet, assignor to Prescott, Scott & Co., S. F.
235,125—GLOVE—F. H. Busley, S. F.
235,210—FENCE—S. H. Chase, San Jose, Cal.
235,127—TRAMWAY—C. M. Chubb, Oakland, Cal.
235,132—ELECTRICAL SIGNAL—C. Cummings, Virginia City, Nev.
235,135—SAFETY CAR—Jean Denechaud, S. F.
235,224—CALYANIC BELT—E. J. Fraser, S. F.
235,231—MANUFACTURE OF CARBONATE OF MAGNESIA—Frederick Outzkow, S. F.
235,233—SHINGLE MACHINE—Oley C. Hanson, Eureka, Cal.
235,085—CARPET SEWING MACHINE—Joseph Hesse, S. F.
235,107—VEHICLE WHEEL—J. M. Nelson, Oakdale, Cal.
235,103—WASHING MACHINE—C. M. Purcell, San Jose, Cal.
235,206—AIR COMPRESSOR—E. A. Rix, S. F.
235,103—CLEANING FIBER—Thomas Threlfall, S. F.
235,232—PACKING BRAN, ETC.—W. L. Williams, San Diego, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

GLOVE.—Frederick H. Busby, 412 Market street, San Francisco. Patented December 7, 1880. No. 235,125. In the ordinary process of the manufacture of gloves a small strip or welt of the material of which the glove is made is placed at all the joints or seams. The object of this strip is to strengthen the seam. In cheaply-made gloves, without a welt, the threads are apt to draw out one of the meeting edges of the material. In the kid or leather of which gloves are usually made, the material is only colored on one side. But even if colored on both sides the welt is sure to show of a different color, since it is necessary to trim it after it is put in place, and the fresh cut shows the natural color of the flesh of the material. Moreover, in trimming the welt considerable loss of time and some expense are entailed, as it must be carefully done or there is danger of cutting the glove in the process, since it can not be done until the glove is finished. These objections are overcome by placing a doubled strip or welt of the same color and material between the seams of the gloves in such a manner that the colored surface only will show, and the necessity of trimming will be obviated. With the glove made in this manner the welt does not present an unsightly appearance in the glove; the welt being uniform color with the glove itself, instead of showing the natural color of the material, as is the case with a single strip.

SAFETY RAILWAY CAR.—Jean Denechaud, No. 108 Eighth street, San Francisco. Patented December 7, 1880. No. 235,135. The object of this invention is to prevent the cars from jumping the track and turning over where, by reason of a sharp curve, they incline to one side. The rail is made very deep, its outer surface being flat and smooth and set on its edge in slots prepared in the cross-ties. Its inner surface is provided with a groove formed by the double flanges projecting from the inner side. Under the car, and between the axles of the wheels, are elbow-shaped metal stays, supported by having their upper ends fastened to immovable lateral plates of metal joining the supports of the axles, and their lower edges provided with a channel or groove, in which move two bolts having horizontal rollers in their ends. These bolts work in opposite directions, and are at such a distance from the bottom of the car as to fit their horizontal rollers into the groove of the rails when directed therein. They are projected or withdrawn by means of a mechanism which may be operated from the car.

VEHICLE WHEEL.—Joshua M. Nelson, Oakdale, Stanislaus Co., Cal. Patented December 7, 1880. No. 235,167. The object of this invention is to provide a means by which heavy machinery and loaded wagons can be transported from place to place over rough or smooth roads without damage either to the machinery or wagons, or to the roads. And it consists of peculiarly-shaped sections of metal or metal-protected wood attached by springs to the felly of the wheel, and turning with the wheel, each section presenting itself to the ground and forming a continuous and traveling track on which heavy wheels of machinery and great wagons can run. This track can be put on or off with little trouble. It would be of much use to freight-wagons on sandy roads, or even on hard roads, as the draft is much reduced, and instead of wearing or cutting ruts, as is usually the case with heavy wagons, it will improve rather than injure the road.

FENCE.—Stephen H. Chase, San Jose, Cal. Patented December 7, 1880. No. 235,210. This invention consists in the construction of the double posts having an intervening vertical space which is adapted to receive the lengths or panels of the fence. These panels are made complete, either with parallel boards and vertical strips at the end, between which they are riveted, or with vertical pickets riveted between top and bottom of the rail. The panels are allowed in either case to move or work about the rivet, so that they may take different angles and adapt themselves to contour of the land over which the fence is to be built, and at the same time fit the vertical posts, between which they are wedged and secured.

TRAMWAY FOR CURVES AND CABLE GROPES.—Charles M. Chubb, Oakland, Cal. Patented December 7, 1880. No. 235,127. This device relates to certain improvements in wire rope or cable tramways, in which cars are propelled by means of a gripe attached permanently to each, and so constructed that it may be made to hold or let go of the cable at will. And it consists in a method of supporting and guiding the cable so that it will pass around curves of any desired radius, and in a peculiar gripe, which is capable of seizing the cable and of being carried by it around the curve, without interfering with the supporting pulleys or guides. By this invention a cable road can be constructed whereon a car can be made to take a route over any street despite the curves, and not be compelled to run along in a straight line.

AIR COMPRESSOR.—Edward A. Rix, 49 Fremont street, San Francisco. Patented December 7, 1880. No. 235,296. By this construction of this device a head is provided which renders it safe to run the piston close to it at every stroke without endangering any part; or if foreign substance should get between them discharge-valve may be used of much smaller area that there will be no great loss of power in opening these valves, as would be the case if a single large valve was employed having the same area of opening as that of the cylinder.

The Mexican Mine.

The Mexican mine, on the Comstock, wound up the year on December 1st with a balance on hand of \$46, having received \$384,664 and spent all but the \$46. Most of this money was spent on the joint shaft of the Sierra Nevada, Mexican and Union companies, Mexican's proportion of expenses being \$218,319. Then it cost \$21,032 to run the north lateral drift, Suro tunnel; salaries and wages, \$74,659; supplies and miscellaneous expenses, \$64,650. According to this only \$144,255 has been expended on the mine.

At the time of the last yearly report of W. H. Patton, the Superintendent of the Mexican, from whose report just published we take the above figures, the Sierra Nevada, Mexican and Union shaft had attained a depth of 30 ft. below the 400 level. It is now 60 ft. below the 2500 level, and will be sunk as fast as possible to the 2700 level, a diamond drill hole having been sent down to the depth of 200 ft. below the bottom of the shaft, which showed no indications of a serious increase of water. The slow progress made in sinking the shaft during the past year was caused by the shaft being employed to its fullest extent in hoisting, from the different levels of the three mines and the vast work of excavating the different tank and bob stations of the pump compartment, and then continuing up the fourth compartment and enlarging and retimbering the shaft to the surface. There yet remain about 1,000 ft. of the shaft to be enlarged and retimbered, which work will be resumed during the coming year, when not engaged in sinking, and when finished will increase the hoisting and ventilating capacity of the shaft 50%. The large pumping machinery has been in successful operation since April last, averaging 4½ strokes per minute and handling at the rate of 160 gallons of water per stroke from the bottom of the shaft to the Suro tunnel level.

No work has been done in the mine above the 1600 level. On that level the system of pipes designed to convey the water from the Union shaft to the Savage company's connection with the Suro tunnel, has been continued through the main north lateral drift on this level to the Union shaft, and now forms the outlet for the water pumped from that shaft.

The north lateral drift of the Tunnel company has been extended into Mexican ground and work has been temporarily suspended therein. By the terms of the contract the Mexican company pays \$70 per foot for running and properly timbering this drift and subdrain through their ground. By this temporary suspension of the work, after the expenditure of \$21,032.90, the stockholders will be relieved at present from the necessary assessments to carry on this work, and the money collected can be applied exclusively to the work of developing the mine.

The bulk of the report is taken up with a description of the work performed during the year, mainly prospecting. Although many streaks of heavy vein formations were found by the crosscuts and drills, no ore of any particular value was found.

[From the MINING AND SCIENTIFIC PRESS of Dec. 11, 1880.]

Twenty-Four Page Holiday Extra of the "Mining and Scientific Press."

We propose, in Christmas week, to print an extra large edition of the MINING AND SCIENTIFIC PRESS. It will consist of 24 pages, and will be handsomely illustrated with new and appropriate engravings, which are now being prepared. This edition will be but an earnest of the endeavors we are making to have the PRESS of 1880 excel its predecessors in all important features.

Among the many articles of value for information and reference in our this TWENTY-FOUR page number, will be the following:

RAINFALL AND TEMPERATURE IN CALIFORNIA. With this article is a very elaborate and extensive table, showing the monthly and total rainfall and temperature from 1870 to 1880, at the following important cities and towns in California: San Francisco, Niles, Livermore, Stockton, Sacramento, Auburn, Cisco, Truckee, Marysville, Modesto, Red Bluff, Fairfield, Merced, Petaluma, Tulare, San Mateo, San Jose, Gilroy, Pajaro, Salinas, Soledad, Redding, Delano, Sumner, Los Angeles, Caliente, Mojave, Colton, Napa, Woodland, Williams, Oakland, Ione, Fresno, Anaheim, Santa Cruz and Martinez. Nothing as comprehensive as this on the subject has yet been published.

A large illustration with description of Dodge's New Shaking Table Concentrator, a machine now in operation here.

COPPER ORES.—Methods of sampling and assaying. How they are bought and sold. Classes of ore and price per unit.

LEAD FUMES.—Analyses of fumes of lead furnaces. Formation of fumes; results of condensation.

OUR GRAVEL MINES.—Condition of our hydraulic mining interests. Late improvements. Projected enterprises.

LEACHING OF ORES.—Results of leaching on this coast.

GOLD AND SILVER REFINING.—Showing the methods by which the various operations are performed at the New York assay offices.

OUR NORTHERN COAST TRADE.—With engraving of one of the class of steamers engaged therein.

INDUSTRIAL NOTES.—The latest news of interest in the industrial world.

PLUMAS COUNTY MINES.—A description of the mines of Plumas county and their present condition.

RICHMANN ROCK DRILL.—A description of a new drilling appliance now being introduced in our mines.

CHLORINATION WORKS.—Engraving and article describing the process and machinery for a new method of chlorinating gold ores.

YOSEMITE IN WINTER.—A handsome engraving, drawn and executed by first-class artists.

These are only a few of the articles being prepared for this extra 24-page edition of the PRESS.

A Wonderful Fissure.

The more the late Ontario strike is thought of and the output of the mine talked about, the more wonderful the great Summit county fissure becomes. Only think, the mine has paid over \$3,000,000 in dividends and is not yet worked to the fifth level. The working shaft is now down to the 700 level and the vein cut at that point. Instead of decreasing in size or quality, the ledge was found 12 ft wide, clean ore and sampled from wall to wall, 700 ounces.

It may be said that a fair sample could not be taken in the way hand samples are generally made; but there is no doubt that the ore is as rich as any found on the 300 level, where the ore ran from 600 to 2,500 ounces.

The mine has paid over \$3,000,000 while working from the 400 level up, and over \$4,000,000 is now in sight. The average battery sample for 12 months, has been \$197 per ton. This is what tells the tale, and there are claims located east and west of the Ontario that will soon have the same tale to tell.

With the Parley's Park shaft down; the Lowell & Williamson under way; the McHenry middle cleared up; the Hawkeye mine developed; the Little Giant in the depths, and the other valuable properties on the east of the Ontario, worked for what they are worth, the latter company will not be enjoying this bonanza alone.

The mines on the west end are being developed rapidly, and the day is not far distant when the Ontario fissure will be worked from the head of Big Cottonwood to the mouth of Red Pine canyon.—*Salt Lake Tribune.*

News in Brief.

COAL prices are declining. MORE earthquake in Europe are reported. MADAME THEIRS died in Paris on Saturday.

FIVE firemen were hurned to death at Cincinnati Saturday.

FIFTY THOUSAND soldiers will be sent to Ireland, if necessary.

FURTHER legislation on the Indian affairs is proposed in Congress.

A SHOCK of an earthquake was felt at Seattle, W. T., Sunday evening.

DURING the late storm, snow fell to a depth of three ft. at The Dalles, Or.

EAST PORTLAND, Or., experienced a slight shock of earthquake Sunday night.

MOUNT BAKER, in Washington Ter., is throwing out fire and smoke from its summit.

CONTRACTS have been let for grading 18 miles of railroad from San Diego northward.

JAY GOULD's conservatory on the Hudson, which cost \$150,000, was hurned Saturday.

SPAIN wants an amicable agreement with the United States about duties on certain goods.

A BITTER war of rats is anticipated between the Western Union and American Union telegraph Co.

NINE-TENTHS of the business portion of Pensacola, Fla., was destroyed by fire Saturday night.

GOULD has bought the privileges of the International Railway Co. from San Antonio to the Rio Grande.

DURING the canal season the largest movement of grain ever made by the canals of New York took place.

SAN SIMON and Leffinwells wharves, San Luis Obispo county, were considerably damaged by the late storms.

IN a fight with "moonshiners" near Cooksville, Tenn., one revenue officer was killed and another beaten nearly to death.

A BILL has passed the Brazilian Senate making naturalized foreigners and freedmen eligible to seats in the Chamber.

THE San Francisco Board of Education has declared that hereafter the positions of all lady teachers who marry, will be declared vacant.

THE jury in the case of Schroeder, for the killing of Dr. Lefevre, at Oakland, after being out 72 hours returned a verdict of not guilty.

A CIRCULAR regarding admission to the grade of cadets in the revenue marine service, has been issued by the Secretary of the Treasury.

It has been decided that General Howard will not return to the Department of the Columbia, but will have an Eastern Department.

THE Petroleum World of Titusville, Pa., charges that for the 19 months ending a year ago last winter the Standard Oil Co., made \$19,000,000.

THE Reading and New Jersey Central roads are said to have united to build a line from Harrisburg to Pittsburg parallel to the Pennsylvania Central.

A RESOLUTION has been adopted in the House of Representatives, expressing sympathy with the laboring classes of Ireland in their present trouble.

EX-GOVERNOR CHAMBERLAIN, of Maine, makes public the fact that Mackay the Nevada millionaire, and a wealthy citizen of Philadelphia, have given \$50,000 each for the endowment of Bowdoin College.

THE proposal to settle the Greek questions by arbitration of the Powers has not yet been formally made. It is thought that Germany and Austria do not favor it.

SECRETARY OF Navy, Thompson has tendered his resignation, and will accept the Chairmanship of the American branch of the Panama Inter-oceanic Canal Company.

THE demand for vessels in the trade between America and Europe is greater than the supply, and 95 vessels, mostly steamers of the largest class, are building on the Clyde.

PASSENGER arrivals in San Francisco last month aggregate 4,439, and the departures 4,482, a net loss of 43. The arrivals from China and Japan were 453 and the departures, 1,363.

THE Persians have destroyed Uchui, killing many inhabitants. They afterwards defeated 12,000 Kurds at Mergewar. Sheik Abdullah is organizing another force for an attack in the spring.

THE Pope has conferred on D. T. Murphy, a wealthy merchant of San Francisco, the hereditary title of Marquis, in recognition of his great services to religion in America and Europe.

DURING the last 11 months the port of New York has made a relative gain in the grain movement over other ports, showing 51% as against 49% of receipts during the same period of last year.

NEW ORLEANS is now the fifth grain market east of the Rocky mountains, being surpassed by New York, Philadelphia, Baltimore and Boston. Boston has shipped 20,000,000 and New Orleans 17,000,000 bushels this year.

THE Senate has confirmed the following nominations: John B. Neil, Governor of the Territory of Idaho; Stephen P. Twiss, Associate Justice of the Supreme Court for the Territory of Utah; Warren Bristol, Associate Justice of the Supreme Court for the Territory of New Mexico.

[CON.]

Vaccination for Scab in Sheep.

EDITORS WATCHMAN:—I desire to announce to your readers that I have discovered a method of protecting sheep from the scab disease by vaccination. The principle is identical with that involved in vaccination to prevent smallpox in the human species. I do not claim that my method of vaccinating sheep will prove an absolute prevention of skin disease, but it will either prevent it or reduce the disease to a milder form, as vaccination in human kind reduces smallpox to varioloid. In the case of sheep there may, in some cases, be a slight surface irritation of the skin which can be easily removed, but there will be no attack of the scab in its well-known virulent and penetrating form. Anyone desirous of inquiring into this new method of meeting the scab disease may address me at the Baldwin Hotel, San Francisco, S. H. KENNEDY.

San Francisco, Dec. 5th.

P. S.—Address, after January 15, 1881, Omaha, Nebraska.

HALL'S VEGETABLE SICILIAN HAIR RENEVER is a scientific combination of some of the most powerful restorative agents in the vegetable kingdom. It restores gray hair to its original color. It makes the scalp white and clean. It cures dandruff and humors, and falling out of the hair. It furnishes the nutritive principle by which the hair is nourished and supported. It makes the hair moist, soft and glossy, and is unsurpassed as a hair dressing. It is the most economical preparation ever offered to the public, as its effects remain a long time, making only an occasional application necessary. It is recommended and used by eminent medical men, and officially endorsed by the State Assayer of Massachusetts. The popularity of Hall's Hair Renever has increased with the test of many years, both in this country and in foreign lands, and it is now known and used in all the civilized countries of the world.

FOR SALE BY ALL DEALERS.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORN—San Francisco.
A. C. KNOX—Pacific Coast.
G. W. McCREW—Santa Clara county.
M. P. OWEN—Santa Cruz County.
J. W. A. WRIGHT—Merced, Tulare and Kern counties.
N. E. BOYD—San Bernardino and Los Angeles counties.
JARED C. HOAG—California.
O. M. THOMPSON—Fresno County.
B. W. CROWELL—Colusa and Yolo counties.
D. W. KELLEHER—Fresno, San Benito, Monterey and San Luis Obispo counties.
W. O. WARREN, Sonoma County.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walled with aquariae constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & Co.'s MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Chew JACKSON'S BEST Sweet Navy Tobacco

METALS.

[WHOLESALE.]
WEDNESDAY M., Dec. 18, 1880.

IRON.	
American Pig, soft, ton.....	32 00 @ 33 00
Scotch Pig, ton.....	28 00 @ 27 00
American White Pig, ton.....	30 00 @ 31 00
Oregon Pig, ton.....	30 00 @ 31 00
Red Hot Bar.....	4 00 @ 8 00
Horse Shoe, keg.....	7 00 @ 8 00
Nail Rod.....	3 00 @ 3 00
Norway, according to thickness.....	8 00 @ 9 00
STEEL.	
English Cast, lb.....	16 @ 18
Black Diamond, ordinary.....	13 @ 15
Drill.....	9 @ 10
Flat Bar.....	9 @ 10
Plow Steel.....	9 @ 10
COPPER.	
Ingot.....	— @ 52
Sheet.....	— @ 20
Sheathing, Tinned 14x18.....	— @ 42
Nails.....	— @ 42
Bells.....	30 @ 42
Old.....	— @ 18
Bar.....	— @ 22
Precipitate, 100 lbs.....	18 @ 19
LEAD.	
Pig.....	4 00 @ 5
Bar.....	— @ 6
Pipe.....	— @ 8
Pipe, Soft.....	— @ 9
Shot, Discount 10% on 800 Bags.....	— @ 210
Drop, per bag.....	— @ 210
Buck.....	— @ 210
Chilled.....	— @ 210
TIN PLATES.	
10x14 I O Charcoal.....	— @ 10 50
10x14 I O Coke.....	— @ 10 00
Banco Tin.....	— @ 25 00
Australian.....	— @ 10 00
I O Charcoal, Roding 14x20.....	— @ 21 00
20x22.....	— @ 21 00
ZINC.	
By the Cask.....	— @ 10
Zinc Sheet 7x3 ft. 7 to 10 lb. less than cask.....	10 1/2 @ 11
NAILS.	
Assorted sizes.....	4 00 @ 4 75

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,
SAN FRANCISCO, CAL., DECEMBER 10, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 35, of Fifty cents (50c.) per share, was declared, payable on Wednesday, December Fifteenth (15th), 1880. Transfer books closed on Monday, December Thirteenth (13th), 1880, at three o'clock P. M.

WM. WILLIS, Sec'y.

Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company.

Nevada Block, Room 37, San Francisco, Dec. 15, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 62) of Fifty (50) Cents per share was declared, payable on Monday, December Twentieth (20), 1880. Transfer books closed until the Twenty-first (21) instant.

W. W. TAYLOR, Sec'y.

REGULAR DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, DECEMBER 2, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. Twenty-two (22) of Seventy-five (75) Cents per share, was declared payable on Monday, December Thirteenth (13), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

EXTRA DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, DECEMBER 2, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, an Extra Dividend No. Twenty (20) of Seventy-five (75) Cents per share, was declared payable on Monday, December Thirteenth (13), 1880, at the office in this city, or at the agency of the Nevada Bank of San Francisco in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company.

SAN FRANCISCO, DECEMBER 7, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a dividend (No. 12) of Twenty-five (25) Cents per share was declared, payable on Wednesday, December Fifteenth (15), 1880, at the office of the Company, Room 19, No. 328 Montgomery Street, San Francisco, Cal. Transfer books will be closed Friday, December Tenth (10), 1880.

JOSEPH NASH, Secretary.

DIVIDEND NOTICE.

Office of the Western Mining Company (Contention Mine), San Francisco, December eighth (8), 1880.—At a meeting of the Board of Directors of the above-named Company, held this day, a dividend No. six (6) of seventy-five cents (75c) per share was declared, payable the tenth (10th) instant.

D. C. BATES, Sec'y.

Office—Room 79 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

ANNUAL MEETING.

THE ANNUAL MEETING OF THE

Stockholders of the Gould and Curry Silver Mining Company

Will be held at the office of the Company, Room No. 60, Nevada Block, No. 309 Montgomery Street, San Francisco, California, on Monday, the twentieth (20th) day of December, 1880, at one o'clock P. M. Transfer books will be closed on Thursday, December sixteenth (16th), 1880, at three o'clock P. M.

ALFRED K. DUBROW, Sec'y.

Alpha Hydraulic Gravel Mining Company.

Principal place of business, San Francisco, California. Location of works, Alpha Hill, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Nineteenth (19) day of November, 1880, an assessment (No. 2) of Twenty (20) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. gold and silver coin, to the Secretary, at the office of said company.

Any stock upon which this assessment shall remain unpaid on the Twenty-fourth (24) day of December, 1880, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Tenth (10) day of January, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

JAMES IRELAND, Sec'y.

Office, No. 218 Sansome Street, San Francisco.

Amusements.

BALDWIN'S THEATER.

THOMAS MAGUIRE.....Manager.
CHAS. H. GOODWIN.....Treasurer.
J. P. CHAPMAN.....Assistant Treasurer.

CINDERELLA.

Corner Market and Powell Streets. Open every evening and Saturday matinee. Box office open daily.

BUSH STREET THEATER.

CHAS. E. LOORE.....Lessee and Manager.

SHYLOCK.

Open every evening and Saturday Matinee.

THE TIVOLI GARDENS.

KRELLING BROS.....Managers.

THE PRETTY PERSIAN.

Eddy Street, between Market and Mason. Open every evening.

Prize Medal, Mechanics' Fair, '80.

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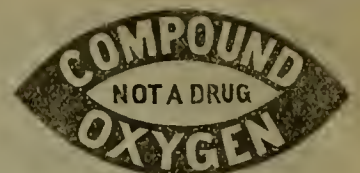
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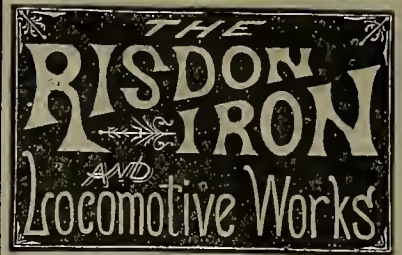
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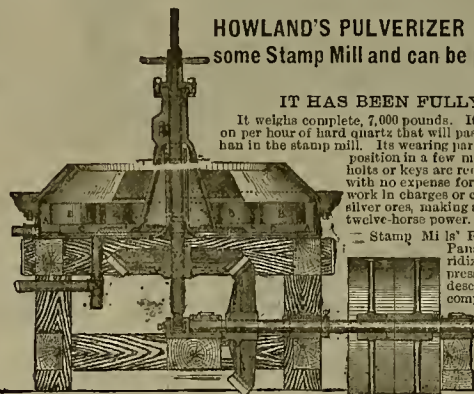
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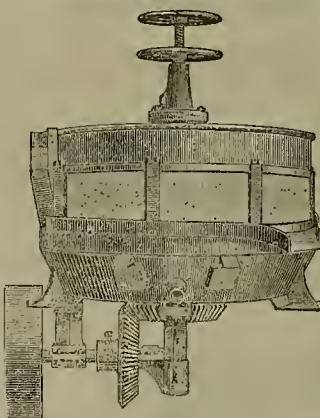
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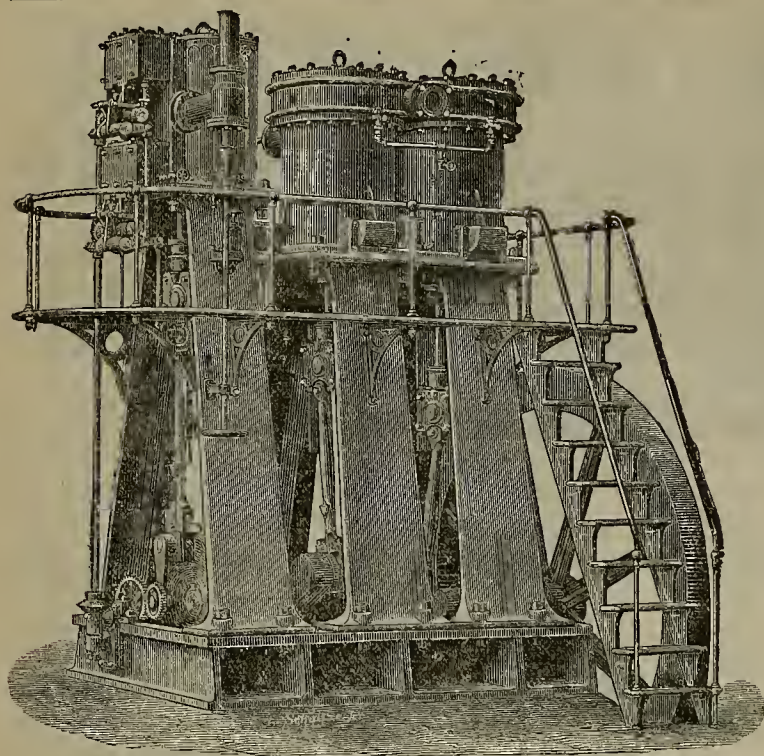
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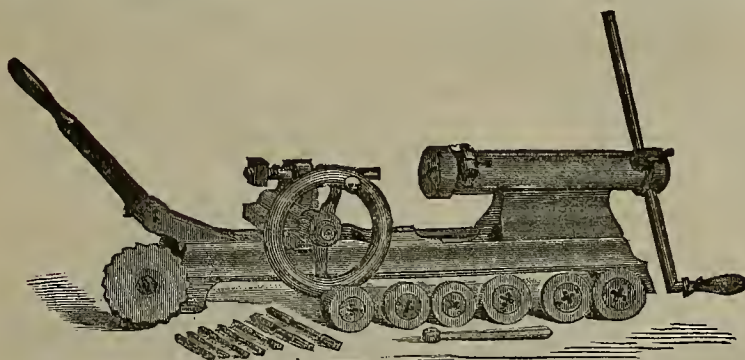
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The Dodge Ore Concentrator.

The engraving on this page represents an improved ore concentrator invented by Miles B. Dodge of this city, a gentleman who has had considerable experience with mining appliances, being also inventor of the well-known Dodge rock-breaker and the Dodge furnace. This is a percussion table concentrator, and its principal feature consists in forming on the inclined table, above the point at which the pulp is received upon it, a depression into which the heavier concentrations will pass, and from which they are continually discharged, while the lighter particles will pass downward with

stopped or slackened, the concentrated material is at any rate stirred and spread so it will move downward to the depressions or boxes intended to receive it. When these become filled their contents are removed.

Mr. Dodge, in examining the various ore concentrators, noticed that when the comminuted ore, mingled with water, was spread in a film upon the inclined percussion table, the tendency of the heavier portions was to move upward, unless it became packed in too heavy masses. He became convinced, moreover, that this tendency was more marked when the light gangue was washed away from the pulp as soon as it was deposited on the table.

It was with these principles in view that he invented the concentrator herewith illustrated, which is designed to overcome the obstacles by

about the point indicated by the double arrow and C.

Above the mouth of the distributor, and nearly at the upper end of the table, is a well or depression, as shown, this being formed across the table and provided with an outlet (indicated by an arrow), through which the concentrated material passes, this outlet being regulated in size in proportion to the mineral in the pulp.

Over this depression is a perforated pipe H, through which clean water is admitted to the well or depression, and thence flows down the table, part of it going out of the hole with the concentrations.

As the pulp falls on to the table it is concentrated in the usual way, the heavier metallic portion settling to the bottom and the gangue

while the concentrations go the other, both being discharged continuously.

The lower end of the table is formed with a concave so as to catch any mercury that may be in the pulp. The table itself is mounted on an adjustable bed, which by means of the screws J, may be raised or lowered to regulate the incline of the table. The frame and movable parts of the table are of iron, and the concentrator is an exceedingly strong one. A machine of this pattern may be seen at work daily in this city at the Empire foundry of Savage & Son, 143 Fremont street. These machines are now so perfected that they are being shipped to the mines.

THE Deadwood and Golden Terra mines, now practically under the same ownership, have been



MILES B. DODGE'S IMPROVED PERCUSSION TABLE ORE CONCENTRATOR.

the current and be carried away, the action being continuous.

Percussion tables as ordinarily made are suspended in such a manner as to have an end or side-shake motion, or a combination of both motions, imparted to them. The table is set on an incline and the pulverized ore is brought upon it in a state of suspension in the water, the motion of the table causing the ore to so arrange itself that the heavier grades will sink on to the surface of the table while the lighter and worthless gangue will pass on down with the stream of water. Riffles, depressions, boxes and various other devices are employed to collect the heavier valuable portions, these being placed on the line of flow of the substance being operated on.

In all of these percussion tables it is commonly necessary to slow down or stop occasionally to push downward or forward the mass of concentrations which collect on the inclined table at a point near where the material is received upon said table. If the motion is not

continuously discharging at different ends the gangue and concentrations, and to take advantage of the upward tendency of the concentrated material by providing a receptacle for it immediately on its separation. The work done by the machine would go to show that he has been successful in applying the principles to practice.

The inclined percussion table is suitably supported in a frame so that an end shake may be imparted to it by means of the cam D, said cam throwing the table forward by striking against the lug or tappet E, and the spring F, drawing it back. On the reverse movement the table strikes against the huffers G, and its movement is suddenly stopped.

The pulp from the hatters is passed into the sluice A, and goes on to the distributing board B, which is provided with spreaders, as shown. The sluice and distributing board are inclined in the opposite direction from the table, as the engraving shows, and the pulp is deposited on said table a short distance below the upper end,

passing off down with the water. A riffle on the table, under the spreader, checks the heavy material, and when checked, the percussive action of the table tends to move the heavier particles up the incline of the table, until they reach the well or depression, where they are caught and passed out of the discharge to a suitable receptacle.

The fresh supply of clean water, carrying no pulp, coming on to the table through the perforated pipe H, flows down over the concentrations and assists in cleaning them and in carrying off the gangue.

This action is continuous. The advantage of the depression above the point at which the ore is received is obvious. It forms a receptacle where the concentrated material is taken out of the way of the pulp. When these concentrations are caught in boxes or riffles below where the pulp is fed to the table, the whole mass of pulp and water passes over them and loss ensues. Here the separating action takes place immediately, and the gangue goes one way,

reincorporated under the name of Deadwood Terra, and the new organization paid its first dividend in New York this week. The Deadwood mine has previously paid 11 dividends of 25 cents per share, and the Golden Terra three dividends of 25 cents per share. Each mine was divided into 100,000 shares, and the consolidated organization, we believe, has 200,000 shares, so that the dividend of 25 cents per share paid aggregates \$50,000, and makes a total of \$400,000 paid by both mines this year.

The million product of Silver Reef district for the present year will foot up nearly \$1,100,000, and as this showing is made with less than an average of 20 stamps, it must be admitted that the output will bear favorable comparison with the yield of any other silver district on the coast. The Miner says that enough ore is there to treble the product, but what is lacking is the capital and energy to put up the stamps.

CORRESPONDENCE.

We admit, under sized, & more of correspondents.—Ers

Mining Districts in the High Sierra—Meadow Lake.

EDITORS PRESS:—Gradually the gold and silver bearing districts have been creeping up both sides of the Sierra Nevada. For many years at first, mining for the precious metals on the westerly-lying slope of this range was confined to its foothills, and on the east to the Wasboe and other mountain chains lying out in the deserts beyond. Some 16 years ago the first important discovery of auriferous deposits lying well up in the Sierra, was made in the Meadow Lake district; this find having caused a wide spread of excitement and induced quite a heavy immigration into that district. This immigration, however, proved premature, the refractory character of the ores there having retarded developments, and finally worked an almost entire depopulation of the district; which, under improved methods of treating the ores, has only quite recently begun to show signs of returning vitality. It is now the opinion of many who have had good opportunities for forming a correct judgment, that Meadow Lake will in the course of a year or two become an active and prosperous mining camp.

The next mining locality discovered at a considerable altitude in the Sierra Nevada, was the

Kearsarge District.

Lying on its easterly flank in Inyo county, and at an elevation of about 7,000 ft., being nearly on a level with the Meadow Lake mines. At this locality several silver bearing lodes were opened, and a mill put up, at which a good deal of hullion has up to this time been made. But work there, while it has been kept constantly in progress, has gone on slowly, the mines, some of which afford good evidence of value, being mostly owned by men of small means. The locality is also remote and difficult of access, which has further tended to retard improvements; and it will not surprise even its most sanguine friends if Kearsarge makes but moderate headway for some time to come.

The next mineral discovery of note made at anything like an Alpine height was

The Mineral King Group of Lodes.

Situated on the west face of the Sierra, in Tulare county, and lying nearly as high as the Kearsarge mines. The lodes here, also silver producing, are numerous and very heavy, but nothing positive has yet been demonstrated as to their value, hardly any effective work having been done upon them. Their owners, however, entertain a good opinion of their merit, proving their faith by expending every year upon them as large an amount of work as their limited means will admit, very little outside capital having as yet been invested in the district. The past summer a forward movement was made at Mineral King, which is to be followed up vigorously next year, and will, it is expected, result in the production there of some, and possibly a good deal of bullion.

The last of these mineral finds lying far up in the great snowy range consists of a metalliferous belt some 20 miles long and covered by what are known as

The Tioga, Prescott and Homer Districts, situate, not like the others, on the sides, but on the very crest of the Sierra, being partly in Mono and partly in Tuolumne counties, California. Having spent a portion of last summer and autumn in that region, remaining until most of the miners had left, I send you the following items of information in regard to it, under the supposition that they will interest some of your readers.

The first and most important of these districts, the Tioga, was discovered in 1879. Not, however, until the past summer, was any considerable population gathered in this region, or much work done, because of its great altitude, over 8,000 ft., and the depth to which the snow falls in winter.

This trio of districts is traversed in a northerly and southerly direction by two ore-bearing belts or channels, the most easterly of which carries gold, and the westerly silver and other metals. The latter, which strikes along the west slope of Mt. Dana, is a powerful vein, measuring over 100 ft between the walls. The country to the west of this lode is granite, to the east, slate and porphyry, it being a contact deposit. The ore here obtained assays well in silver, the tests ranging from \$20 or \$30 up to \$300 or \$400, and in exceptional cases to \$2,000 or \$3,000 per ton. There appears also to be a good deal of it, though on this point it would be premature to hazard any estimates, as no explorations of consequence have been made in either district. All that can be affirmed of the country in its present undeveloped state, is that it is a good one to prospect. That the claim-owners have great faith in it, it is needless to say; as when did the locator of a mine ever permit himself to doubt that it held somewhere in its bowels a veritable bonanza? It is more to the purpose to know that several disinterested and competent experts, who have visited and examined these districts, have expressed much confidence in their value.

What Has Retarded the Progress of the Country

Has been the inordinate prices asked by locators for interests in their claims, the most of them excited by the great size of the veins and the good surface exhibits of ore so generally obtained, having held their grounds at figures too high for mines so little proven. Had these men not seen things quite so large at the start it is likely that they would have succeeded in disposing of some of their claims to parties who visited the country early in the season with the purpose of investing, but were discouraged from doing so by the extravagant ideas of the miners. Later in the summer, some sales were effected, but not in time to admit of any large operations being started upon them. Among others who procured interests there before the winter came on are a number of residents of this country, who, it is said, will do some thorough work next season, getting at it as soon as practicable. Among their improvements will be a mill, which, if prospects warrant, is to be of very large capacity. Large reduction works will, in fact, be the rule there if any at all be required, as there will probably be plenty of workable ore if it only holds in depth. Some of the more sanguine miners affect to believe that we shall as regards size of mills see the experiences of Deadwood, Dakota, there repeated. So far as wood and water are concerned these districts are better conditioned than Deadwood, nor are the winters there any colder than in that part of Dakota, though perhaps somewhat longer and the snow deeper. Among others who have obtained large interests here are several

San Francisco and Eastern Parties, All of whom through their associates and agents express a purpose to get to work next spring as early as practicable, and test their properties thoroughly.

A man named Bunker, agent for some Eastern investors, a Boston company, I think, has got hold of a large extent of ground in the Tioga district, which is generally accounted valuable, and which, according to report, is to be prospected in the spring, and outfitted with a big mill if ore developments will justify. That all this rumored work will be undertaken and he followed by results calculated to warrant so much mill building, let us hope. Still when the local press, the itinerating scribe and the Tioga claim holder unite in assuring the world that a vast population of miners will, of a certainty, be gathered into these districts the coming summer; that cities will spring up and multitudes of great mills be erected there, it will be safe to largely discount such statements, though doubtless these ardent souls believe they will each and all be realized.

Sonora, Cal.

Silver Mining in Peril.

EDITORS PRESS.—The great question before the mining community will soon be, is silver mining to be abandoned or not? and this question will arise in the one, is the silver dollar to be a part of our currency or not? The people want it, but the banks say they do not, and which now, I will ask, is the power behind the throne, the people or the banks? I say the banks, what can the people do when a confederation of 2,000 national banks, are all thinking and moving for one purpose in the halls of Congress? Their power in the future we can be assured, is equal to all they have had in the past. Already is there a settled move against the interest of silver mining, in the efforts of Secretary Sherman (the national banks' conspirator), to (1.) cease the coinage of the standard dollar, (2.) increase the weight of any future coinage to 450 instead of 412½ grains. What is this increase of silver equal to, but an increased discount in crude silver, and does not silver bullion have enough to contend with now in the average discount of about 15%? what other business can stand such a deduction on its values and thrive? It is impossible for silver mining to do so, with any increase of discount.

Miners as a general thing pay but little attention to financial questions, but things are now getting to a pass, where they are compelled to for self-preservation, silver miners especially, and it stands every one in hand to raise his voice in favor of the standard dollar—the full and better coinage of silver, as well as gold—or they had better quit silver mining. This question will have able defenders in both the House and Senate of the U. S. Still against them, stand the power of the banks. It is the people who must begin to talk and act, and talk in such a way as to strike somewhere against the influence that is now about to crush the silver mining interest of the Pacific coast. In Senator Jones the silver miner has an able advocate, but Senator Jones must have the voice of the people to support him. In the interest of the banks Secretary Sherman piled up in the Treasury over \$70,000,000 of silver dollars but the pressure of the people forced its outgo. The past has shown that the people want it, if the powers will only let them have it, and the more coined, the more will be wanted, the less will be the discount, and in turn so much more profitable will be silver mining.

In this question the State of Nevada has a

mining State. A citizen of Nevada informed me a few days ago that his discount on his silver product was \$165,000 and he was unable to continue longer and in fact has shut down his mills and mines.

If the past has produced failures, in consequence of such heavy discounts, what will be the condition of the interest, if further pressure is brought upon it? That one of the great resources of wealth of this coast is in danger, should arouse the people to action as the depression of so vital an interest is the depression of all interests, in proportion. But the question comes, what can the silver miners of Nevada, Utah, Arizona, Montana, Idaho and California do? Why, I will answer, they can watch their representatives in Congress, and express to them their sentiments, and watch then, to see if they do not bow before the golden idol of the banks. And here let me say what is going to be attempted if the people are not watchful of their interests:

(1.) The demonetizing of silver.

(2.) If the way is not clear to demonetize, then to increase the weight of the dollar to bring it equal or better than gold.

This increase of silver in the dollar is as we before stated equivalent to an increase in discount, and I ask my silver mining friends, can you stand it? If you cannot then watch, and fight it.

ALMARIN B. PAUL.

December, 1880.

A Naturalist at Santa Barbara.

EDITORS PRESS:—The best place at Santa Barbara for collecting marine animals is—Santa Barbara. To this conclusion I arrived after wandering to Rincon, eastward, and almost to Moore's Landing westward. The wind blew pretty roughly from the southeast the day I went to Rincon—the people called it a storm—and next day the beach at Santa Barbara was strewn with kelp. Huge tangled masses of laminaria and other large algae, ending in "roots" formed of a maze of interlacing fibers, lay mixed with detached fronds and disjecta of all kinds. In these netted roots live many curious objects, not often found on the sea-shore. There is the home of the serpent-star or ophiuran, who wriggles himself out as his home is invaded by axe or knife, and coolly proceeds to drop himself to pieces before he can be secured. A quick plunge in fresh water is the only cure for this suicidal propensity. Probably his nerves are less shocked by the unsalted element than by alcohol; at any rate he drops to bits in the latter before he dies—a terrible warning to drunkards.

All the serpent-stars were of one species (an *Ophiotrichis*), but in the same hiding-place live numerous crustaceans, the commonest of which is a little shrimp, (which isn't a shrimp, but its only right name is its scientific one, so shrimp is the nearest English), having two large front claws or hands, one of them much larger than the other. This little fellow has the power, by forcibly bringing together the fixed and movable fingers of his hand, to produce a snapping noise the loudness of which seems out of all proportion to the creature's size. His objections to being disturbed, even though he be placed in salt water, are shown by vigorous snapping, and in alcohol he snaps till he dies. Then various curious worms, some living free, others dwelling in tubes of their own formation, or in hollow twigs of the algae, are found in abundance, and a few shells are entangled in the meshes of the roots.

What is this bright red object, about 10 inches long, with purplish-brown warts all over, that is crawling on the sand among the seaweed? It is a holothurian or sea-cucumber, and I quickly secure it, although I know that in alcohol it will lose all its beauty of coloration. It is the first I have seen alive, so I must have it. In the ocean these sea-cucumbers are abundant, and are common on the sea-shores of the Islands of the Pacific. They are eaten, and considered a delicacy by many nationalities. They are the trepan of commerce, the *beche de mer* of the French.

And what is this bunch of elongated yellowish objects with bright red tips, their narrow ends united in a common stalk which is shrouded by a growth of sea-moss? In shape, each one is like an attenuated Indian club. This is an animal, or rather a colony of animals, and is one of a tribe known to naturalists as compound ascidians. With this name the non-naturalist must be satisfied unless he can find another. Organless though they seem outwardly, within they are tolerably complex, having a very elaborate breathing apparatus, stomach, intestine, heart and nerves. Cutting across the stalk to which the colony is united, tiny sparks of golden light appeared, and the same occurred when the animal was handled in the dark. The light was not a paly diffused phosphorescence, but in distinct sparks or points.

Here is another ascidian. This is not a compound, but a simple or single organism. It looks like a leather bottle, or a small yellow squash—a living pulsating squash. Now we are vertebrate animals, or animals with a backbone, so are all mammals, so are birds, so are reptiles, and so are fishes, (true fishes, not shell-fish and star-fishes); the lowest fish,

and little in common with other fishes except the possession of a backbone; and, strange though it may seem, the larva, or young of certain ascidians have a sort of backbone, and many naturalists tell us that it is to these humble creatures that we must look for the vertebrate parent stock.

Compare a hag or a lancelet with an ascidian, and certainly one is about as good an animal as the other, so don't be too proud of your backbone.

Here is another sort, crawling, purple-striped object, with four horns or tentacles in front, and looking more like a prettily-colored slug than anything else. It is in fact a sea-slug—with a difference. A true sea-slug (and you can find them here, attached to the under side of rocks) has no tentacles at the head end, and bears its gills externally. This creature we have found does not have its gills exposed, and has a small shell under the skin in the broad slit you see on the back. Below, it has, like other mollusks, a fleshy foot, on which it crawls. Call it an aplysia, and you will err greatly.

Many Kinds of Shells

Are found at Santa Barbara, some of them quite rare, found only in certain localities, or when a storm tears off the algae or stones to which they were attached, and hurls them on the shore. A large kind of cowrie or *Cyprea* (*C. spadicea*) is one of the rarer shells, and I was told I was fortunate to pick one up upon the beach. A still rarer shell is sometimes procured upon Santa Cruz Island, about 25 miles away. It is the delicate paper nautilus (*Argonauta Pacifica*) and is not truly a shell, but the egg-case of the female of a creature having eight long arms, and in its anatomy as well as general appearance closely resembling the octopus or so-called devil-fish, so common all along our coast. So fragile are these floating shells, floating in from far away on the broad Pacific (for the Argonaut is a dweller in the open ocean) that they must be gathered as they come in upon the wave that bears them. A dash upon the rocks is fatal to their integrity.

Another oceanic shell (*Janthina Globosa*) floats in upon the shore at Santa Barbara in stormy weather. It is fragile, small, bright violet in color, and a true shell, but the creature that forms it forms also a curious egg-raft, fitted to float upon the ocean wave.

The Hermit Crabs

May be thanked for examples of many shells, the original owners of which do not live within ordinary tide-marks. These curious-looking free tenants of houses they did not build, do not take possession by forcible ejection of the peaceful molluscan holder and owner, as their human equivalents sometimes do, but occupy shells deserted by the death of the latter. As each heir of the mollusk builds his own house, increasing it to suit, there is no dispute about titles, and the hermit trots off unmolested with his house on his shoulders, or rather, over his abdomen, a part of his anatomy which is not favored by nature with a hard covering. When he has outgrown his shell, he leaves it to look for another. Some singular forms of crustacea live in holes in the sand; others are parasitic in tubes of worms, or inside the shells of clams; others inhabit the gills of fishes, while others are the so-called "whale-lice." The resident of Santa Barbara has every opportunity to make a large collection of this extensive class of creatures—the insects of the sea.

On every pile of the old wharf, as evening approached, solemnly sat a black cormorant, and the gulls had a rich harvest on the kelp-strewn beach.

Birds.

Rincon, some 14 or more miles east of Santa Barbara, has quite a reputation as a good collecting ground, but we were unfortunate, procuring little but the large pyramidal shells popularly called castle-tops, and some peculiar marine worms. On our way we noticed the great abundance of the sparrow-hawk, which sat pertly perched upon the fences and telegraph wires as we drove by. A very useful bird to man is this same sparrow-hawk, and should not be shot, as he is too small to hurt poultry, but feeds largely on the young of such pests as the ground-squirrel and the gopher.

There is only one native bird which, for commonness, impudence, can compare with the introduced English sparrow, and that one is what is called here the blackbird, or sometimes Brewers' blackbird. This bird will coolly let you drive within two or three ft. of him, and, when nesting, will brush close by you with a scream, as if to frighten you off. From birds to

Whales

Is a long stride, but we must take it. Evidences of the abundance of these monsters of the deep are plenty all along our coast. Ribs and vertebrae are scattered upon the beaches from Humboldt to San Diego. With a "whale fishery" at almost every convenient point, at San Francisco, at Half Moon bay, at Monterey, at Port Harford, at Point Concepcion, and I know not at how many other points, the wonder is how the whale, at least the California gray whale, manages to exist. The broad entrance path to Monterey Mission church is paved with the centra of the vertebrae of whales; and the threshold of many doors in the same place are similarly constructed. At Port Harford the first object I saw was the axis or second vertebra of some cetacean, and at Santa Barbara a jaw bone formed the curb of a drive in

MECHANICAL PROGRESS.

Possibilities of Emery.

When a piece of hardened steel is to be reduced in size it is useless to attempt the ordinary methods of turning, planing or filing; the obduracy of the hardened material rendering all such attempts abortive. Hardened steel or case hardened iron—which is hard steel externally—must be ground, instead of being wrought. The difference between working or “tooling” metals of great hardness is shown in the impossibility of filing, chipping or turning hard steel, and the facility of reducing it by grinding. It would be futile to shape to edge a hardened turning tool by the file, and yet the hardest turning tool is put into shape by the grindstone. These facts seem to intimate that there is a possibility for the use of a cheap abrading material to take the place of costly steel tools, that must be forged, shaped, tempered and adjusted to do any work; and when a small portion of the work is done must be again forged, shaped, tempered and adjusted.

This continuous round of forging, hardening, tempering and adjusting to work is a drag on work. It is impossible to keep a turning or planing tool in serviceable shape for any appreciable time. A large proportion of the time of the workman is used up in keeping tools in order. The grinding of turning tools seems to furnish a lane leading out of our costly practices; and it is possible that the producer of abrading wheels may assist our practical mechanics to an improved and better way.

It is acknowledged that the processes of turning and boring—exterior turning and interior turning—do not give exact or repeated results. We cannot turn a shaft, or journal, and be sure it is “round,” or really cylindrical; and we cannot bore a box and swear that it is true from end to end; or, if true, that it will fit the turned journal. Why cannot these two processes be made to agree? Because the methods used are so different. The shaft, or journal, is turned by a fixed and really rigid tool, and every turn, of even a thirty-second of an inch can be seen, and whenever there is the slightest deviation from the right line it can be instantly corrected; and besides this, any untruthfulness can be rectified by well-known methods, as filing, grinding with clamps, or running over with metal boxes charged with emery and attached to the tool carriage.

But in internal turning the operator cannot see any distance, and must depend on the integrity of the tool and the accuracy of the lathe. In such work the introduction of a tool adapted to the aperture appears to be the only means of approaching accuracy.

There is no question that better fits and better finish can be got by the grinding than by the cutting process, and these fits and this finish when once made would be permanent, and take the place of our present loose method of gouging out and cutting in. What is needed is a surface solidity and permanent wear, and not a mere coming together.—*Boston Journal of Commerce.*

RENDERING IRON FIRE-PROOF.—Iron, as is well known, is in some respects the very best material that can enter into the construction of a building, and in other respects it is the worst; of the latter phase we would speak. It is hardly necessary to refer to the fact that iron pillars and joints are very susceptible to the influence of heat, and that a fire of small magnitude will soon warp and twist them to such an extent that the fall of the whole structure becomes a certainty. Iron will endure pressure and strain under ordinary circumstances, but will quickly succumb to the influence of heat. To guard against this and to place it in the front rank of materials used in construction, it is proposed, with reason, too, that in all buildings in which iron is a factor, it be encased in some non-conductor of heat. Terra-cotta has been suggested as the remedy. It may detract from the appearance, but that should be subsidiary to safety. If iron can be rendered a salamander, it is certain to rise in favor, because it possesses all the other desirable properties required in the construction of buildings—lightness, strength and beauty.—*Insurance World.*

SIZE OF GOVERNOR PULLEYS.—The *Manufacturer and Builder* gives the following rule for fixing the size of governor pulleys: To find the diameter of the governor shaft pulley, multiply the number of revolutions of the engine by the diameter of the engine shaft pulley, and divide the product by the number of revolutions of the governor. To find the diameter of the engine shaft pulley, multiply the number of revolutions of the governor by the diameter of the governor shaft pulley, and divide the product by the number of revolutions of the engine.

A REMARKABLE CASTING.—The most novel exhibit shown at the Brussels National exhibition by the Seraing works is a remarkable casting. It consists of what is practically the whole cast iron works of a marine engine, with a pair of cylinders about 20 inches in diameter by 20 inches stroke, cast in one piece—bed plate, condenser, air, and feed, and bilge pumps, standards, cylinders and exhaust pipe.

Hot Journals.

One of the most important parts of an engineer is to see to it that the various bearings of the machinery in his charge are smooth, of uniform surface, and rightly adjusted. This apparently simple duty frequently requires the exercise of his best judgment; it is not only necessary that the journal-box surfaces be close to the journal, but it is frequently just as necessary that the journal boxes be prevented from accidentally approaching closer to the journal. In a steam engine under full head of steam the play of one-sixty-fourth part of an inch between the crank-pin boxes and the crank pin may be sufficient to jar the whole engine; and yet, if the engineer in endeavoring to take up this lost motion, should accidentally overtighten the crank-pin boxes, the chances are that a broken crank pin or pitman, and a knocked-out cylinder head, will serve as an illustration of the union which is apt to take place between the crank pin and its boxes under such circumstances.

Many an apparently unaccountable break in a revolving shaft has occurred from a defective bearing. Heavy shafting, carefully lined in hangers secured to the workshop ceiling, may for months run without any sign of heating; but a pile of iron castings, or other heavy weight, unequally disposed on the floor overhead, may cause sufficient deflection to expose the revolving shaft to one of the most destructive strains, and cause one or more of the hanger bearings to heat. In machinery the wearing away of one of the parts may subject another part to destructive strain, and it generally requires the exercise of experience and judgment in the construction and handling of the machinery, in order to prevent the harm. Many tons of coal have been wasted, and much wear and tear of belts and machinery caused by inattention to these defects.

In steam engines, especially, the adjustment of the journal boxes requires close attention. The expansion of the journal by heat, the quality of the lubricant used, the condition of the bearing surfaces and the amount of pressure they will be subjected to, exclusive of dust, speed of revolution, etc., should be taken into account. In all metal there is more or less elasticity, and when one box of a journal is by means of its screw bolts drawn to the right position in regard to its journal, it should also bear solidly on the other box, in order to maintain the adjustment of the boxes to the journal; if this precaution is neglected, when the shaft is revolving, the elasticity of the screw bolts appears to act to cause an approach of the boxes, thereby squeezing out the oil from between the bearing surfaces, and causing them to heat or grind. It appears that the continuous motion in one direction of one metal in close contact with another, tends to produce a still closer contact, and finally a union of the metal surfaces; the lubricating oil, by preventing direct contact of the metal surfaces, opposes this tendency, and the use of liners or equivalent means to prevent the improper approach of the journal boxes, aids the oil in insulating itself between the bearing surfaces.

It is surprising to watch the effect of a few minutes' grinding of a journal in its bearing. We have seen a twenty-horse engine, under full pressure of steam, brought almost to a standstill by the sudden grindings of one of the bearings of a shaft about two inches in diameter. It appeared that the shaft would have twisted off sooner than revolve in the defective bearing.—*Scientific American.*

A NEW MOTOR.—A recent French invention of considerable interest, is an improved motive-power engine, worked by means of atmospheric pressure under the effect of barometric vacuum. By means of two connecting rods, a shaft receives a rotary motion produced by the action of two parallel cylinders. Each cylinder is closed at one end, and communicates with an oscillating cylinder in the form of a U, which may be placed either horizontally or vertically. When it is placed horizontally and filled with mercury, as well as the motive cylinder, the piston is at the end of the cylinder; the oscillating cylinder is then placed in the vertical position, the mercury falls, and the barometric vacuum being produced, the piston pushed by the atmospheric pressure re-enters the fixed cylinder. The oscillating cylinder then again takes a horizontal position, and the mercury re-entering the fixed cylinder, the piston moves in a contrary direction. The second fixed cylinder is so placed that its piston and that of the second oscillating cylinder are the reverse of the cylinder. Counter weights equilibrate the weight of the U-shaped cylinder full of mercury.

TEMPERING CHISELS.—A practical mechanic communicates to the *Scientific American* the following: In hardening and tempering a cold chisel care should be taken to have a gradual shading of temper. If there is a distinct boundary line of temper color between the hard cutting edge and softer shank portion, it will be very apt to break at or near that line. The cutting edge portion of the chisel should be supported by a backing of steel gradually diminishing in hardness; and as with all metal cutting tools that are subjected to heavy strain. Not every workman becomes uniformly successful in this direction, for, in addition to dexterity, it requires a nice perception of degree of heat and of color in order to obtain the best result.

SCIENTIFIC PROGRESS.

The Photophone in Paris.

The photophone appears to be attracting increased attention among the scientists at the French capital. Among the most recently announced discoveries of Prof. Bell in this connection, is the interesting fact that melted sulphur conducts electricity like selenium, but only at temperatures below that at which it thickens and becomes dark and viscid.

The Professor was to have read a paper upon the photophone before the Society of Arts at their meeting on the 1st of the present month (December.) So much interest was manifested in the promised meeting that word was given out that only members could be admitted, and that even they would be required to provide themselves with special tickets issued for the occasion.

Hearing Sounds from the Sun.

The *Comptes rendus* for Nov. 2d informs us that Prof. Bell and M. Janssen have attempted to hear with the photophone the sounds believed to accompany the rapid commotions taking place in the solar photosphere. The experiments were made at the Observatory of Meudon, a selenium cylinder being placed in different parts of an image of the sun some two ft. in diameter. No very conclusive results were obtained, but M. Janssen has further suggested that a sort of concentrated effect might be obtained by passing a number of successive photographs of a sun-spot across a beam of light, the variations of the intensity of the beam producing sounds when they fall upon the sensitive “photophonic pile” of selenium. Further experiments in this direction are still in progress, in the result of which the scientific world is eagerly interested. If success should attend their efforts, it would be one of the most wonderful achievements of science ever accomplished, and in the light of what has already been done, it is perhaps nothing more than may reasonably be expected.

THE ATMOSPHERE OF CELESTIAL BODIES.—M. Jose J. Landeur communicates an interesting paper to *Les Mondes* on the atmosphere of celestial bodies. Whereas previous investigations have given about 250 miles as the furthest result for the height of the earth's atmosphere, M. Landeur places it at not less than 22,000 miles. He corroborates his calculation by showing that the height at which meteoric matter becomes incandescent on approaching the earth is far beyond the distance heretofore assigned to it, and therefore there must be an atmosphere at that greater distance to produce the incandescence. He also accounts for the spectrum of the aurora borealis, showing a marked coincidence with that of the zodiacal light by the theory that since the earth travels in the zodiacal nebulaosity from September to May, the rarefied atmosphere beyond the earth's heavy envelop of air must absorb some of the constituent elements of the zodiacal nebulaosity, and thus these elements make their presence apparent in the spectrum of the aurora, which phenomenon occurs in this rarefied outer envelope. M. Landeur believes also that the difference between the observed acceleration of the moon's mean movement and that obtained by calculation on any of the previously advanced hypotheses, which is very marked, may be wholly explained by the resistance of this nebulaosity in the moon's movement.

GEOLOGICAL MAPS.—It should be widely known, because of evident importance, that at the International geological congress to be held at Bologna, in 1881, a prize will be awarded of 5,000 francs for the best international scale of color and conventional signs for the graphic representation of formation of geological maps and sections. Many of our geologists might go in for the prize, not for its money value, but for the sake of making a certain department of geology intelligible when presented to the eye. The Babel of coloring in geology at present, here and in other countries, is enough to cause a dispersion of those who come to learn, and depart in disgust when they find that a very important means of conveying knowledge is in itself confictory.

THE COURSE OF A LIGHTNING FLASH.—Prof. Tait, of Edinburgh, insists that when people think they see a lightning flash go upward or downward they must be mistaken. The duration of a lightning flash is less than the millionth part of a second, and the eye cannot possibly follow movements of such extraordinary rapidity. The origin of the mistake seems, he says, to be a subjective one, viz., that the central parts of the retina are more sensitive, by practice, than the rest, and therefore that the portion of the flash which is seen directly affects the brain sooner than the rest. Hence a spectator looking toward either end of the flash very naturally fancies that end to be its starting point.

A LADY ENTOMOLOGIST.—Emily A. Smith, a well-known entomologist of Peoria, Illinois, has gone to Leipzig, where, if the university authorities will allow it, she will pursue a general course of zoological work in the new laboratory of Prof. Luckart. This lady was recently elected a member of the Entomological Society of London.

PHOTOGRAPHIC NEBULÆ.—Prof. Henry Draper read an interesting paper on the “Photographing of the Nebulæ in Orion,” to which brief mention was made in these columns last week. In the course of his remarks the Professor said, “The gaseous nebulae are bodies of interest, because they may be regarded as representing an early stage in the genesis of stellar or solar systems. Matter appears to exist in them in a simple form, as indicated by their simple spectrum of three or four lines. It is desirable, therefore, to ascertain what changes occur in the nebulae, and determine, if possible, the laws regulating their internal movements. Drawings by hand have been made of some of the nebulae, and especially of the nebula in Orion, for upwards of 200 years. But drawings are open to the objection that fancy or bias may distort the picture, and it is, therefore, difficult to depend on the result, and to compare the drawing of one man with that of another. To apply photography to depicting the nebula is difficult, because these bodies are very faint, and, of course, owing to the earth's motion and other causes, they seem not to be at rest. They require a large telescope of special construction, and it must be driven by clock-work with the greatest precision. All such difficulties as those arising from refraction, flexure of the telescope tube, slip of loose bearings, atmospheric tremor, wind, irregularities of clock-work, foggy or yellow state of the air, have to be encountered. The photographic exposure needed is only an hour, and a slip or movement of a very small fraction of an inch is easily seen in the photograph when it is subjected to a magnifier. In taking the photographs Prof. Draper used a triple achromatic objective of 11 inches aperture made by Clark & Sons, according to the plan of Mr. Rutherford, for correcting the rays, especially for photography. This telescope was mounted on an equatorial stand and driven by a clock made by Prof. Draper. The photographic plates were bromo-gelatin, and about eight times as sensitive as the wet collodion formerly employed. Having described the photographs, Prof. Draper remarked that a series of photographs taken at different seasons and in different years would make it possible to determine, with some precision, what changes, if any, are taking place in the nebulae.

THE AURORA BOREALIS.—Special attention is being paid to observations of the aurora borealis in the Scandinavian portions of Europe. We have already the results of 839 observations, taken at 132 different stations and on 154 different nights during the seven months of the winter of 1878-79. These observations have been arranged by Herr Tremholt under four heads, as follows: Longitude and latitude of observer; time of year and age of the moon; color, form and altitude of streamers; and lastly, any sound which may have been observed. The deductions from the observations thus far made, in the opinion of Herr Tremholt, lead to the conclusion that the aurora is a local phenomenon, circumscribed by narrow limits, and manifested at inconsiderable distances from the earth's surface. The light is generally white, less often red or green; in high latitudes it not infrequently presents spectral colors, and finally, that the accompaniment of sound is an indisputable fact. Herr Tremholt has devoted his attention to this subject for many years. He is now engaged in making as full and complete a catalogue of these manifestations as is possible. With this object in view, he invites the co-operation of observers everywhere, both upon sea and upon land, to the end that he may thus gather materials for the better elucidation of the interesting phenomena connected with these manifestations.

A NEW SPEAKING MACHINE.—The *Journal of Science*, reports that Herr Faber lately exhibited his new speaking machine before the Physical Society, London. It is designed to imitate mechanically the utterance of the human voice by means of artificial organs of articulation made on the human model, and it is worked by keys like a musical instrument. A hollow made of wood and india-rubber serves for lungs. A small windmill is placed in front of the bellows to give trilling sounds. The larynx is made of a single membrane of hippopotamus hide and india-rubber. A mouth with two lips, a tongue, and an india-rubber nose complete the organs of the apparatus. Fourteen distinct sounds were uttered by it, and by combining these any word in any language can be pronounced. Laughing and whispering were also produced, and the pitch was raised or depressed at pleasure.

IMPORTANT TELEGRAPHIC DISCOVERY.—*Nature* of Nov. 25th says it is announced that the electric cable manufacturing firm, Berthoud, Borel & Co., of Cortaillod, in Neuchâtel, have made a highly important discovery in practical telegraphy. After a long and expensive series of experiments they have succeeded in devising a method of laying cables whereby the inductions of the electric current from one wire to another, although the wires are in juxtaposition, is prevented. This discovery, it is asserted, removes the last obstacle in the way of the widest possible extension of facilities for telephonic communication.

GEOLOGIC PHENOMENA.—To the alteration and metamorphism of rocks by the infiltration of rain and other meteoric waters, M. De Koninck, of the Belgian Academy of Sciences, assigns the cause of many hitherto unexplained phenomena in geology.

MINING SUMMARY.

The Mining Share Market.

Of course the whole attention of the mining stock people has been concentrated on Alta. It went way up and then it went way down; and it is at the latter price just now. When it was going up, there were not many questions as to the reason why; but when it began to fall there began to be inquiries as to why it ever went up. The water brought it down; but what sent it up? Was it a bona fide development, or what? And what is the *real* condition of the mine now? The public charged fraud on the managers. A public meeting was held. The Trustees held a meeting and passed resolutions calling on the Superintendent to explain. The Superintendent then explains in a long letter, and says there is an ore body. He says it may be safely estimated that the body penetrated by the drill

Mining Accidents.

An accident took place in the Bald Mountain mine, Sierra county, the other day, which resulted in the death of one man and the serious injury of four others. A man by the name of Peterson was running the other persons out in a car, when from some cause it jumped the track and caught Peterson between the car and timbers, cutting his arm nearly off. He died in a short time. The other men were not fatally injured. It was a narrow escape for all the party.

John Spohn, an old resident of Downieville, says the *Messenger*, was killed on Monday last, about noon, by falling from the bank of the creek into the bed of the same. He had been living for a great many years in the old log cabin just this side of the grave yard. sun

was engaged in pa
brought to the ravine in

little water. To get down into the ravine he had cut a sort of trail down the steep bank just above the bridge. The theory of his death, judging from appearances, is that he was going down this trail with a load of gravel when he slipped and fell, striking heavily upon a large rock in the bank, about half way down and thence falling upon the sharp rocks at the bottom. The cabin in which the old man lived is the oldest in this section, being built of logs and just high enough for an ordinary sized person to stand erect. It has a mud floor and is altogether the most primitive of habitations. The deceased was, we believe, a native of Pennsylvania, and aged 61 years at the time of his death. It is said that his wife and children in the East, are well off and desired him to return and spend his remaining days in peace and plenty, but he would not go.

FIRE-PROOF ROCK.—Adolph Breh, who has been furnishing our firemen with sandstone,

base of Bald mountain, will return to his old quarters in a day or two, and stack up the hlocks for another summer's demand. He is justified in his project by the word of mining men, who think much of the fire-proof rock will be needed next season. The success of the Atlas run on Dunderberg ores awakes the owners of other furnaces to the fact that there is money in the running of the same on custom ore.

CALAVERAS.

EL DORADO.

SOLD.—Mr. Filippini, we understand, has recently sold his Garden Valley mine to Mr. Scott, of San Francisco, who has awarded a contract to Bell & Graves for doing a certain amount of drifting from the bottom of the old shaft, some 70 ft in depth. They have been drifting to the north, and are now upon a large ledge of fine looking quartz. So we learn from Mr. Heindel, who was up from here yesterday.

tion of the surface. The contractors are making the progress in sluicing. They work 3 shifts of 2 men each, of 8 hours stretch. The contract price is \$186 per ft, they furnish their own tools, powder and caudles, while the owner of the mine does the rest. There were 2 other bids put in for the work, one was \$37 and the other \$30, we believe. The Cornishmen, so far, are making big wages, and should the slate grow no harder they will do well. The pumps work smoothly, it having less than 3 inches of water to keep up, while it is capable of lifting 4 times that quantity. The mine is owned by A. J. and J. C. Chas. is superintendent. The carpenter work, and Messrs. J. H. & J. Taylor are the engineers.

and M. Co. have about completed the hydraulic mining of 15-inch pipes at Greensburg, 10 miles from the mouth of the Colorado river, Muntz and one or two other mines laying on the west slope of American canyon. These mines are located on the well-known Greenwood seasonal belt, and are owned by Eastern capitalists, and are under the management of Messrs Gould & McChillough. When these mines are once open they will afford employment for many persons, and will be of great benefit to the country. F. L. Ballard is also investing Eastern capital at or near the mouth of American canyon, having purchased the Von Bremen and Molly hydraulic mines, and is now fitting them for thorough and energetic working. Messrs Ballard & Gould have also purchased the well-known Sardine river mine, and are now working it under the ordinary method of digging the dirt through a shaft, and discharging it at the east shore, above high water mark. The power mine, at Fraser flat, is now under the management of Mr M. I. Head. This mine is also owned by Eastern parties, and is ready for washing. Work on it will be energetically pushed. The few things needed to develop the great water power of the Colorado river are capital and a large supply of water. The application of both may be considered certain in the

liners during the past week because of the scarcity of water. We notice that some are inclined to censure the

men employed by the ditch owners for negligence on the ditch above. Upon investigation, we find that our friends are entirely wrong in their censures. We see the Placer Herald that the ditches over on the other divide are also slack of water, from the same cause. The snow above is quite deep, the surface frozen, and, the ground being dry, most of the water was absorbed, and consequently the ditches on the divide are slack of water, and the water does not amount to enough for practical purposes. For the company to keep the ditch open from snow and ice above is a little more than they are able to do.

MONO.

BELVIDERE.—*Free Press*, Dec. 17: During last week the west crosscut from the south drift passed through the vein formation and into the hard west country rock. Nothing of value having been encountered in this direction, this work was stopped and work resumed in the south drift. The ledge is showing a marked improvement, about 6 inches on the east wall giving assays of from \$51.31 to \$77.60, chiefly in silver. On the west side of this drift is 2 ft. of low-grade ore, which is showing improvement as the work advances, and from its course will unite with the rich seam of ore on the east wall in a few feet further. When this junction is reached we may look for improvement in the entire vein.

LENT SPLIT.—The excavation for the foundation of the pump-boiler and engine is now completed. It is 76 ft. long, 36 ft. deep, 16 ft. wide, and will be laid in solid masonry, making it impossible for the machine to be secondarily moved from any strain in working the shaft. These works, when completed, will ensure the speedy development of these valuable properties to a depth of from 1,500 to 2,000 ft. At a depth of 600 ft. crosscuts can be run into the Bodie and Mono ground, and the Bodie opened at a depth of 100 ft. below its now lowest levels—a very important consideration.

RED CLOUD.—The Red Cloud is a perfect bee-hive. The carpenters are calling up the pumping engine-room, the masons are covering up the top of the boilers and the machinists are hard at work setting up the 500-horse power, direct acting, compound pumping engine. This is a fine piece of machinery, and it is expected that all will be completed, together with the pumps, and started up by Jan. 1st.

GOODSHAW.—The new hoisting works building of the Goodshaw is again set up, closed in and the roof ready for the timber. In order to strengthen the building, a carpenter shop 14x30 ft. on the south side, and a blacksmith shop of the same size on the north side of the main building, have been built, with the main building's 25 ft. makes these works 53 ft. front by 90 ft. in depth. The foundation for the engine is all complete, and the engine set in place ready for operation as soon as connections with the Bodie are made.

ADRIANA.—The upraise from the 500 level on the ore chimney has made connection with the 400 level. The upraise will be started from the 400 level in a few days and continued on the chimney.

GLYNDALE.—The east drift continues hard, and at a distance of 30 ft. will be discontinued. The machinery and everything in and around the mine are working well.

SPACIALE.—They are stopping on the 100 level. They have now about 125 tons of ore ready to ship to the mill. The mine is sufficiently opened to supply the mill with ore to its full capacity. The mill will be started on the arrival of a steam force-pump, now on the road.

BONIS TUNNEL.—The header is now in 2,130 ft. The rock is very hard, but works well. The tunnel will be continued to the company's east line, 3,000 ft. from the mouth of the tunnel. It is the intention of the company to erect a mill.

CHAMPION.—Work in the north drift, 550 level, is making good progress. The ledge continues to improve, showing a richer character of ore at the face than any yet found.

STANDARD CON.—The Standard Con., after paying 2 dividends for last month, aggregating \$150,000, started off with the first full week last December, with a showing that would seem to indicate a similar if not larger payment for the present month. This company extracted 1,213 tons of ore last week, from which was obtained 4,305 ounces of coarse bullion, and the average pulp assay for the week was \$36.08, a very considerable increase over that of any previous week for many months. The mine also shipped for the week \$92,500.30.

PACIFIC COAST.—The south drift from the east crosscut, 600 level, is in 25 ft. the face being in vein matter assaying from \$17 to \$41.20 per ton, 55% of the metal being silver. A drift was started north on the vein from the crosscut and advanced 6 ft. with the face in ore of fair milling grade and carrying from 60% to 70% of silver.

BOSTON CON.—The north drift, 300 level, has been advanced 7 ft.; total length, 216 ft. The vein has widened to 5 ft. the ore is rich, and in quality, and the thickness of the drift indicates further improvement in width of vein, carrying now about 3 inches of clay on the east wall.

NEVADA.

YOU BET MINES.—*Cor. San Juan Times*, Dec. 18: Since I was over on the ridge there have been several claims started up, and old ones put in workable shape, over here, and no doubt the owners reap handsome returns. This snow coming so soon was unexpected. At You Bet there are only three leading mining companies, viz., Hayward & Co., of Chalk Bluff; John Hussey, of the same gravel range; and at You Bet town or Brown's hill, the English company, which has several claims, and is now working it. They have just filed up a claim at Red Dog, known as the dependence hill, through which the blue lead runs, and which was drifted a few years ago by Mallory & Co., and paid well. At Waloupi this same company has claims which are good, and the Brown's Hill claims are nearly worked out. Brown Bros., who own the claim adjoining the English company's claims, have under consideration whether it will be feasible to bring water from the Little York ridge over Sheep hollow, a distance of 1 mile through heavy iron pipe, to work their claim. It will cost several thousand dollars, but I understand that water can be obtained for 6 cents an inch, which is 1 ft. of water is charged by the South Yuba company. It is the impression of many that it will be a paying investment. E. P. Hubbard, formerly of Columbia Hill, is working his claims on the fine hill by the drifting procedure, and has a good ground, but there is a poor show to obtain water, unless a long flume is built or pipe laid. This ground will pay for the investment, but a poor man can do nothing alone; hence Mr. Hubbard has to drift. Mr. John Hussey has one among the best claims in Little York township. Hunt's hill, the claims of A. G. Turner, are the only ones going to be worked this year, unless Mr. Wood gets his claims in shape, which will make two. Sargent & Jones have expended much toward fitting up their hydraulic claims this fall, and will run both the drift claims and hydraulic. The company's claim is situated on Quaker hill. The Knickerbocker claim, owned by Hottinger & Lindemer, will be run with profit to the owners. They have dug a new ditch from the head of their old one to the Silver Flat canyon, while the old 100 level is 4 ft. water in winter. On Scott's flat there will be 3 claims worked this winter—first, the Jordan claim, then the Hethington & Hartung, and the Wiseman & Co.'s mine. The Silver Flat claim will run, at the upper end of Scott's flat. Ashburn & Co. will rush the debris down on the foothill farmers. Remington Hill mines are reported as paying well. The claims of James Collier are being worked regularly.

SKAHAN'S RANCH.—Thomas Christopher and Joseph Russ, old time friends, made us a brief visit on Monday morning last. These gentlemen, with others, are engaged in running a tunnel, at Skahan's ranch, into the bedrock claims. They are now in nearly 1,500 ft.

Muncie.—*Argonaut*, Dec. 19: The new shaft at the Muncie was connected with the old 100 level on Monday night. It will be sunk 200 ft. more, and levels are to be run at each 100 ft. About 6 months will probably elapse before this work is completed so the mine can be run to its full capacity again. Only 20 men are employed.

MARTIN & MITCHELL'S MINES.—*Nevada City Transcript*, Dec. 21: Martin & Mitchell's Canada Hill mine is in a prosperous condition. The place is a fine one. There are now 150 tons of ore on the dump. The 4-stamp mill, which has been idle recently on account of a lack of water, is again in operation. It crushes 10 tons of

quartz every 24 hours. The owners of this claim also have a promising hydraulic claim in the same vicinity. They will probably begin working it this season.

SARGENT & JACOBS' MIXE.—Sargent & Jacobs' drift mine is steadily improving. The last lot of gravel that was washed paid between \$9 and \$10 a ton. The machinery is run by water power, thus enabling the gravel to be handled at a cost of \$1.50 a ton. The ground in the drifts is getting softer, and on Jan. 1, 1881, the force of men will be increased and the mine worked on a more extensive scale than at any time in its past history. Washing was begun Monday in the company's hydraulic claim in the same vicinity, where about 30 men are employed. There is an abundance of free water now to ensure a profitable season's work in the claim. Sargent & Jacobs expect to have about 100 men at work on their claims soon.

PLACER.

WORK SUSPENDED.—*Dutch Flat Forum*, Dec. 18: The work of running drifts in the Franklin gravel mine has been suspended by order of the Board of Trustees. The drift being run by contract was ordered stopped before it had been completed. For the past 8 months prospect drifts have been run in this mine in different directions from the main shaft for the purpose of finding a pay dirt that would justify drift mining, but none having been struck so far, it was determined by the board to suspend, for a while at least, this claim in on the same gravel lead as other claims that have paid handsomely to drift mine, and it was thought pay dirt for that character of search has been found in the Franklin. But so far the search has been to see something done in the direction of opening up this mine for hydraulic work. It is the expressed opinion of old miners that large pay could be taken out of this mine with proper management, after a good tunnel had been cut to open up a passage for washing.

SIERRA.

FOREST QUEEN.—*Mountain Messenger*, Dec. 18: The owners of the Forest Queen mine have taken out 7 or 8 tons of ore and taken it to Old Bluff to be crushed, to ascertain how much it will pay. They sunk on the ledge a few feet only, but found the rock richer as they went down. It would appear that the tunnel just barely cut the apex of the ledge, and had the tunnel been a few ft. higher it would not have tapped the ledge at all. They are still running the tunnel ahead.

SCALES DISTRICT.—Winter has once more wrapped our little town in its white mantle. The snow still continues to fall, there being about 3 ft. on the ground at present, and by the looks of things we are likely to have as much more before the sun will be able to show his warm and genial face. It is the more, which at this time of the year is doubly welcome. The different mining claims around here are all in readiness for water whenever it starts.

NEVADA.

WASHOE DISTRICT.

AN IMPORTANT CONNECTION.—*Virginia City Enterprise*, Dec. 18: The connection recently made between the California and Ophir mines on the 2300 level is rapidly cooling off both mines at that depth. Before the connection was made, the drifts were intensely hot. It was about as much as men could do to endure the heat in them without doing any work. When the connection was first made, the heat was so intense that the miners were obliged to quit work, and the miners to think for a time that there was a fire some where below. The draft set in motion found gases drawn from every chink and cranny, and the smell of these helped to create the impression that there was a fire some where in the lower regions. All the bad air has passed out. There is a streak of ore on the 2100 level that may now be mined.

UNION CON.—*Hill News*, Dec. 20: During the past week 405 tons of ore have been extracted, and 453 tons have been sent to the mills; assay value, \$32,336. On the 2500 level drill hole No. 3 has been extended 120 ft.; assays, from a trace to 86.

SIERRA NEVADA.—On the 2300 level the incline has been raised 25 ft. During the week 109 tons of ore have been mined, assayed from \$16 to \$111 per ton.

CALIFORNIA.—During the past week \$10 tons of ore have been extracted and sent to the mills; assay value, \$18,250 per ton. On the 2300 level the north drift has been advanced 5 ft. and connected with the south drift from the Ophir.

HALE & NORCROSS.—On the 16th inst. a drill hole was started west from the face of the west crosscut on the 2400 level. After boring through 55 ft. of quartz and porphyry, the bit was broken off the drill. From the point where the bit was lost the distance to the west wall is not less than 120 ft. During the week 34 tons of ore, assaying \$43.75, were extracted from the 2100 level.

MEXICAN.—On the 2500 level the joint Ophir east winze has been sunk and timbered 13 ft. The joint Union Con. upraise has been extended 20 ft.

CON. VIRGINIA.—During the past week 783 tons of ore have been extracted and sent to the mills; assay value, \$30,200 per ton. On the 2300 level the south lateral drift has been advanced 25 ft. Bullion shipped during the week, \$58,335.28.

OPHIR.—On the 2500 level the joint Mexican east winze has been sunk and timbered 13 ft.; the joint Mexican west crosscut extended 25 ft.; joint California upraise extended 20 ft. On the 2300 level the California east crosscut has been extended 40 ft.

OVERMAN.—Have made fair progress opening station in winze at a point 375 ft. below 1900 level. No work done in incline upraise during the past week. Forman shaft has been sunk and timbered 20 ft.; total depth, 1,575 ft.

UTAH.—During the past week the east drift on the 1950 level has been extended 21 ft. The east drift on the 1950 level has been extended 21 ft. There has been no change of ground worthy of note.

C. & C. SHAFT.—The shaft has been sunk and timbered 4 ft.; total depth below the 2300 level, 179 ft. We are preparing to run the diamond drill down to explore the ground for water.

CALIFORNIA.—Pumps have run an average of 133 hours per day, consuming 6 cords of wood per day. Forman shaft has been sunk and timbered 20 ft.; total depth, 1,575 ft.

ORIGINAL KEYSTONE.—The shaft is making good progress, being down about 200 ft. The bottom of the shaft is in good blasting ground, which is full of small seams of quartz.

CON. IMPERIAL.—Have done very little work last week except pumping water. The 2000 level is now free of water, and we are engaged in cleaning out the drifts on this level.

UNION SHAFT.—Taking up the water at the bottom of the shaft, cutting out tail-pit at the 1600 level, a hob-pit at the 2200 level and casing timbers at the 2400 station.

SAVAGE.—The force was engaged in repairing shaft, driving level drift, and in work upon stations and upraise in the lower part of the mine.

C. N. S. SHAFT.—The 2 lower sections of the hydraulic pipe is in place and secured. Are now waiting for material from the foundry in San Francisco.

POTOMAC.—Drift run 91 ft. No material change in the formation of ground since last week.

O. & C. & B. SHAFT.—Shaft sunk 30 ft.; total depth, 1,355 ft.

CENTRAL DISTRICT.

AT WORK.—*Silver State*, Dec. 15: S. W. Hammond, of Central district, is in town. He says everybody in the camp is at work, and several of the miners are taking out some small streaks of 40 to 60 ft. in length, and are giving the camp and give it a lively appearance. Deer are seen in the vicinity frequently, and the boys devote some of their spare time to hunting them.

EGAN CANYON DISTRICT.

CROSSCUTTING.—*Ward Reflex*, Dec. 18: The tunnel of the San Jose company (formerly Stoptoe & Social), at Egan Canyon, which was run a number of years ago by Gen. Rosecrans, is being crosscut in several places. One seam of ore on the right side of the tunnel has widened to over 2 ft. in places, and from it go \$100 in silver and over \$700 in gold. Eighteen men are employed in the tunnel, all crosscutting.

EUREKA DISTRICT.

A SUCCESS.—*Eureka Sentinel*, Dec. 20: The Atlas furnace has now been running about 10 days, and during that time has never had a stoppage of any kind, which is rather an unusual thing for the starting up of a new furnace. It is making an average of about 6 tons of bullion per day, and Mr. Dowlen, who has charge of the furnace, is well pleased with the financial outlook of the business.

PARROT.—A cable, which had been used at the Richmond holding works for mining ore, parted yesterday as the cage was coming up with a carload of ore on board. The "safest" halted the concern in a second, and no damage was done.

OSCEOLA DISTRICT.

PLACER GROUND.—*Ward Reflex*, Dec. 18: The placer ground owned by Hampton & Godby, at Osceola, is being vigorously prospected under the supervision of St. Pierre, and developments have been made that will bring water into that camp next year without fail. He has sunk what are known as the Treasure Shaft, which prove beyond a doubt that they have a bank of auriferous earth 273 ft. thick. No. 1 was sunk 103 ft., and from this point a drift was run 6 ft. and a shaft sunk from the end of the drift 63 ft. when another shaft of 6 ft. was run, from which they sunk 43 ft. from the bottom of the first drift was run 24 ft., which struck bedrock. They found colors from the grass roots to the bottom.

RUBY HILL DISTRICT.

IRKMA.—*Ruby Hill News*, Dec. 18: The Wales' new machinery will arrive at the mine next Tuesday. Yesterday the Jackson shaft down, throwing 18 men out of employment. Oliver Dean, of the Zulu mine, who was formerly employed in the K K, will soon depart for the Black Hills. The Zulu shaft is down 100 ft. A drift has been run west 20 ft., which has shown an averaging \$150 per ton. Tom Werry and other parties are doing the assessment work on the Central Hill mine. The shaft is down 10 ft., all in good ore. Yesterday a contract was let at the Albion mine to sink an important winze. Just now this mine is looking well. At the bottom of the shaft a station has been cut and a crosscut started to the southeast.

SILVER CANYON DISTRICT.

RRARY TO RUN.—*Ward Reflex*, Dec. 18: Dr. L. B. Brooks and T. C. Poujade came over from Silver Canyon Thursday. The Doctor reports that the mill was ready to run when he left. He came on business requiring his personal attention, and will return in a day or two.

TUSCARORA DISTRICT.

PROMISING.—*Eureka Sentinel*, Dec. 16: Private letters from Tuscarora speak most encouragingly of the prospects of the camp. The mines are represented as showing splendidly, and the business men are all sanguine of the future. For some time Tuscarora is one of the best and most productive districts in the State.

UNION DISTRICT.

ORE.—*Eureka Sentinel*, Dec. 19: The Mineral Hill and Union District miners are still sending ore down the road for treatment. The drifts are showing several streaks of ore in from that section, and more is to follow. The fact is settled that there will be a furnace in Union district early next spring, if not before.

WARD DISTRICT.

PROGRESS.—*Ward Reflex*, Dec. 18: Since the Main tunnel was cut down on the 20th of last month the progress made will average about 7 ft. a day. The crosscut to the south is in about 230 ft., leaving 120 ft. yet to run before the old Clay chamber is reached. A few little streaks and bunches were encountered Sunday last that could be called ore.

ARIZONA.

PIONEER.—*Globe Chronicle*, Dec. 16: Mr. O. Scott has been doing some work on this mine, and has opened out quite a body of rich ore. The bottom of the main shaft has been sunk to 70 ft. (which is below permanent water level) upon a 24-ft. streak of fine sulphureous ore, and the crosscut is run 16 ft. through the ledge is low grade ore, with no water.

GRANT REPUBLIC.—Work on this mine is showing quite a body of ore. A drift on the 60 level is in 10 ft. through milling ore, which has a rich streak in the center 13 inches wide. There are a number of mines in the same neighborhood, such as the Pioaer, Arizona and others, which lay under the disadvantage of lack of capital for development.

THE LITTLE BLESSING.—This claim, near Miami, was recently discovered by Messrs. Anderson & Nupton, and has an excellent showing of ore on the surface. They have put men at work on the claim.

THE TRER.—A new shaft has been commenced on the Turk, at the extreme southwest end of the claim, where there is an excellent showing of good ore on the surface. It carries a quantity of born silver. The ledge crops over the surface, and varies from 4 to 6 inches in thickness.

ROWAN.—This claim, since the recent strike of gold ore made upon it, has been, by development, made into a paying mine. The main shaft is down 35 ft., and shows more or less high grade ore, while the streak of rich gold ore in the center will average from 1 to 3 ft. wide. Fred Medler extracted a ton of this ore last week which produced 50 ounces of gold. Then, from the surface and dumps at least 150 tons, which will yield over \$100 per ton.

CALIFORNIA.—This mine is opening out with great promise, as every opening shows milling ore. The southwest drift has been extended 60 ft. The road to the Champion mill is almost completed, and we understand it will start up on California ore this week, there being 150 tons on the dumps.

AMERICA.—This mine forms one of the groups situated near the East Fork of the Verde river. Upon the America the ledge has been cut in over 150 ft. deep by a creek, and shows from within 12 ft. of the top right to the bottom 14 ft. of solid ore between the walls. An open cut has been run in upon it, and samples worked in assays have yielded from \$25 to \$30 per ton in free gold.

ZULU.—This mine, which is owned by a small group, and has also a large ledge, which shows on the surface 3 ft. wide. A shaft has been sunk 65 ft. on a rich streak of free gold ore about 24 ft. thick. Careful assays lead the owners to believe that this ore will average \$175 per ton in gold.

EXCURSION.—This mine is on the Tonto gold belt, and is being actively developed by the New York company to whom it belongs. The main shaft is now sunk 120 ft., and was put down to 100 ft. and is being driven on as to put the property in good shape to keep a mill going. The vein will run about 4 ft. wide, and the ore just taken out will average \$30 per ton in "free gold."

GOLDEN WONDER.—This is one of the prominent Tonto gold mines which is assisting to bring that section into notice. The main shaft is 65 ft. deep, and has been sunk on a rich ore streak 30 inches wide, 40 ft. in length, and is claimed, will yield in assays \$100 per ton in gold. There have been 50 tons of average ore worked, which returned \$64 per ton.

HOUSE & ROUSE MINES.—The mine known by this name consists of 4 distinct claims, which have been laid out so as to cover the large number of veins that occur in the portion of the Tonto gold belt from which the gold ore is, and are 25 in number, generally running parallel, although there are a few with cross courses. In size they are from 1 to 4 ft. wide, and show very distinct and well defined. A shaft is sunk 45 ft. deep on the largest vein, which is 4 ft. wide, and all good milling ore. A tunnel has also been run 142 ft. to crosscut the veins, and has already gone through 4 of them. This carry high grade ore.

LAST CHANCE.—This mine is about 3 miles east of Tonto in Delahay basin, and comprises 2 full claims on the same ledge, which are distinguished by distinct ore croppings

nearly the whole 3,000 ft. The main shaft is 65 ft. deep in good ore, and 8 prospect shafts from 10 to 15 ft. deep also show the same quality of good milling ore, of which there is over 100 tons on the dumps that will average \$70 per ton in gold. Near the mine is a good mill site, with water sufficient for a 10 stamp mill.

GOWAN.—This adjoins the Zulu, and has the same large ledge of free gold ore, which an open cut shows to be about 7 ft. wide. The ore passes out well, and there is a considerable quantity which will pay well by assays. The owners of the America group have also several claims in the vicinity upon smaller veins, which carry milling ore. They have been prospected by a number of cuts and openings, which all show more or less good ore, some of it being very high grade and certain to yield well in the 6 stamps that have just been constructed by Mr. Samuels and his partners. These poor men's mills are to be driven by a 30-ft. over-shut water wheel, a ditch for which has been made, taking the water from the East Verde.

COLORADO.

ROBERT TUNNEL.—*Georgetown Courier*, Dec. 16: The Robert tunnel, Cascade district, owned by C. E. Bigelow, T. E. Schwartz and Harry Meers, is now in about 75 ft., and it is expected that the Exchange and Blouline lodes, for which the tunnel is being driven, will be intersected within the next 25 ft. The lodes form a junction at the point the tunnel will cut them, and at the surface show a large and promising outcrop.

ONEA.—A body of very rich ore is being opened in the Shively mine, on the 155 level of the shaft.

DUNDAS.—Mr. Andrew Stevens, the new superintendent of the Dundasberg, states that everything is progressing satisfactorily at the mine, with the exception of a scarcity of fire wood just at present, which prevents the running of the concentrating mill more than 10 hours per day.

JOHN ELEPHANT.—Since our last issue a half dozen more lessees have been out to work on the Red Elephant property, in the Hoca Nest and at the Schwarz and Hogan shafts on the White, and the average grade of the ore sold has been better than at any previous time since Mr. Fish has had control. Ore shipments have been retarded of late on account of the frozen condition of the road down the mountain side.

MUSCOVITE.—The Muscovite lode, in Cascade district, better known as Denise O'Fallon's lode, was sold last Friday to R. Harry Worthington, of the Deuver *Inter-Ocean*. The purchaser has been working the lode during the past 2 months, and has become satisfied of its value.

SILVER KING.—Work is going steadily forward on the Silver Ring lode, Cascade district, at driving the side on the vein ahead. The lode was found to be faulted, which made crosscutting necessary, and it was only recently that the ore vein was found again.

STRIKE.—Geo. Marsh and Wm. Haywood are the ones who are in luck this time. They are the owners of the *Etina* lode, which is situated about half way up Orifith mountain, near the Comet trail, and recently they let a contract to drive an adit on the vein, which, at a distance of 100 ft. from its mouth, has exposed a vein of decomposed ore from 3 to 6 inches thick, that is worth from \$500 to \$800 per ton.

MONTANA.

STRIKE IN THE BELLS.—*Butte Miner*, Dec. 14: It has been found that the entire mass of matter between the 2 wells carries metal in greater or less proportions, and that at least 30 ft. of the distance the ore carries a uniform assay value of 25% copper, with several rich streaks, assaying high in silver. It is from these streaks that so much of the rich silver-copper ore shipped to the East during the past summer has been produced. The low-grade copper ore, which carries 25% copper and a few dollars in silver per ton, is not being extracted. But something better is now being extracted, the attention of the owners of the property is known that there are ore of the Bell which are the richest produced in the east. After the deposits between the middle and east shafts had been, to a great extent, worked out, and after further sinking had developed the presence of some remarkably rich silver-copper ore in the 160 level, little attention was paid to the work of prospecting nearer the surface. Some time ago, however, it was decided to extend in an easterly direction the 60 level, which had previously been running only west. The old shoot was followed for about 50 ft., yielding some fine free ore, but at this point the rich ore played out, and little else than worthless ledge matter was visible in the face of the drift. Progress was continued, however, and, after passing through 20 ft. of barren rock, another and far richer shoot was discovered last Sunday. The ore is fabulously rich in this district. Yet remarkable as it may seem, the Bell is now producing ore from the 60 level, high above water, many pieces of which are literally incrustated with silver, beautifully white and pure. Some 25 tons have been taken out.

MOUNTAIN BOY.—Some delay in sinking has been occasioned during the past few days by the removal of timbers from the shaft, but these were delivered on Tuesday, and yesterday 3 shifts of men were employed to sink the shaft, which will now be put down with all possible expedition.

MOUNTAIN BOY.—At the bottom of the incline, at a depth of 210 ft. the east and west drifts have been extended nearly to a level with the 160 level. The company has supposed that free silver is found only in combination with bases. At least native silver above the water line has occurred very rarely in this district. Yet remarkable as it may seem, the Bell is now producing ore from the 60 level, high above water, many pieces of which are literally incrustated with silver, beautifully white and pure. Some 25 tons have been taken out.

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MAONA CHARTA.—It is now reasonably certain that popular expectation in regard to the magnitude, permanence and richness of this ledge will be fulfilled. From the bottom of the main shaft the crosscuts have been driven ahead with the 160 level, and the ore has been encountered and penetrated a large body of ore. The north crosscut has struck the vein which the shaft cut at a depth of 65 ft., and the one running south has uncovered the main ledge on which the Alice and Moulton have been developed.

NEW MEXICO.

BOBTAIL.—*News and Press*, Dec. 9: Work has been progressing on the Bobtail, in the Cimarronito camp, during the past 2 or 3 weeks. There is now an open cut in about 40 ft. crossing the vein, and showing considerable ore, about 200 tons of which is now on the dump. The ore is iron and copper, carrying silver and gold, and in places is very richly decomposed, showing gold. Great improvement is reported during the past week. Robert Ball is the principal owner.

REBEL CHIEF MINE.—We are in receipt of some specimens of very fine gold ore from the Rebel Chief mine, on Uto creek, about 20 miles from Cimarron. This valuable property was discovered some years ago, and was worked to some extent on the surface by the company. Since then it has been worked underground, being about 30 ft. The ore then extracted was treated in assays with considerable profit, but owing to the distance from communication, and the expense of transportation, work was stopped and not resumed until the property was purchased by the present owners, the Cimarron mining company, of New York, I. W. England, of the New York & Arizona Press, and J. W. England, of the New York & Arizona Press. The company has a tunnel 140 ft. long and tapped the veins (for there are 2) at the depth of 120 ft. At the point of intersection an upraise was made to the bottom of an old shaft, and this affords excellent ventilation. A drift from the tunnel has been driven west 40 ft. on the lower vein, and is in pay ore in cars.

Rebel Creek District.

From a recent number of the *Silver State* we glean the following facts about this district:

Until quite recently little attention was paid to quartz mining in the northern part of this county. The country, in consequence of the nutritious grasses indigenous to the mountains and valleys, was, with the exception of Paradise valley, devoted almost exclusively to stock raising. Mounted vaqueros galloped their broncos over the plains and traversed the mountains, but as they were on the lookout for cattle, they paid no attention to quartz. Since the discovery of mines in this Paradise mountains, more attention was paid to quartz leads by the cattle men and station keepers along the Idaho road, and among the first discoveries made by them was

The Ohio Mine.

This ledge proved to be rich from the grass roots down as far as prospected, and several carloads of the ore shipped to Salt Lake for reduction left the shippers a handsome profit. This resulted in the formation of a new mining district, which embraces the mountains from Willow Creek station north, along Rebel and Willow creeks. These mountains were prospected to some extent, and several quartz leads were discovered and located in the hills along the creeks. The principal locations, besides the Ohio, which is called the representative mine of the district, are the Emma, Silver Wave, Paymaster, Iowa Con., and Ethan Allen.

This Emma was discovered by A. H. Ruse. It is situated about a mile and a half north of the Ohio, and is prospected to a considerable extent. The ledge is uncovered a distance of 1,000 ft. on the surface, and is developed by two tunnels. The upper tunnel is in on the ledge 55 ft., and the lower tunnel, 100 ft. below, is in 35 ft. The ledge is about six ft. wide, and well defined. It is enclosed in gray porphyry on the footwall, and by limestone and slate on the hanging wall. The ore is free milling, and assays from \$25 to \$104 per ton in gold, and from \$185 to \$351 in silver.

The Silver Wave is about a mile east of the Emma, and is owned by H. H. McColly and Paul Sieric. A tunnel 80 ft. long is run on the lead, which carries considerable ore, and promises to be a good mine.

The Paymaster is about a mile southeast of the Silver Wave. The vein is opened by a tunnel 50 ft. long, and the character of the ore is similar to that of the Ohio. It is owned by McColly, Edwards & Co.

The Iowa Con. is owned by Ben. Harris and the Bernard brothers. The ore is principally chloride and horn silver.

The Ethan Allen is about seven miles from the above mentioned mines on Willow creek. The character of the ore is different from that in the other mines, as it carries a high percentage of galena, and will have to be smelted.

Facilities for Mills.

Willow creek is situated on the Idaho road about 54 miles north of Winnemucca. There is water enough in the stream to run a 10-stamp mill by water power at all seasons of the year. There are fine groves of cottonwood on the stream, and at its mouth are thousands of acres of the finest sage-brush in the State. This brush, which is almost as large as ordinary cedar trees, furnishes cheap and good fuel for steam mills, for which purpose it is extensively used in this and other parts of Nevada. The district is a very inviting one for capitalists; the mines are all in the hands of the original owners, who are disposed to give investors a fair show.

ARIZONA.—The following is from the *Bodie Standard-News*: Ned Reddy, who left Bodie about a month since for the fabulous gold fields of the sunny South, arrived in Bodie yesterday. Mr. Reddy, in addition to visiting outside camps, made a specialty of the grand central point of attraction—Tombstone. This town is situated 23 miles from Benson, a station on the Southern Pacific railroad, a good line of stages connecting the two points. The town contains about 4,000 inhabitants. The resources of the town are the Contention mine, employing 12 men, and having a 30-stamp mill; the Toughnut with 17 men, and the Grand Central with 25 men. Thousands of men are broke, with no prospects for work. Business of all kinds is generally overdone. The games will give an idea of the prospects. There are seven ten-cent check faro games doing a starvation business. Arizona is about three years ahead of its population. At the expiration of that time it may be a good country to locate in, but at present the great mass will do well to give it a wide berth. For my part, Bodie suite me. Of all the old-timers I have met, not one but wanted to get back.

UTAH MINES.—The *Bodie Standard-News* recently, in speaking of miners leaving that camp for Utah, says: Before starting they received very encouraging news from the southern part of the Territory. Utah is a wonderful section of country, and her mineral deposits are almost inexhaustible. She is cursed with Mormonism at present, but the day is not far distant when she will rival the most favored sections of the coast. During the past year she has made rapid headway in mining, and much money has been invested. The chances of making a raise in Utah are more favorable than in Arizona.

Last month the Utah Southern road received 2,921,763 lbs. of bullion and 3,778,357 lbs. of ore.

Yosemite in Winter.

One of the most remarkable canyons connected with the Yosemite valley is that leading up to the foot of the Vernal falls. There are two ways of reaching the head of these falls—the one by an easy ascent along the ridge to the right of the canyon, and the other, very difficult, by following through the canyon itself, the walls of which, at one point, completely overhang the trail. On arriving at the foot of the falls, the visitor is met by a perpendicular wall of rock, up which not even a cat could climb without artificial aid. To enable him to reach the summit, a series of rough ladders has been erected, as shown in the engraving. Even by such aid, the ascent is not only difficult, but dangerous. It was here that Campi, the well known restaurant keeper of this city, lost his

The Tree Planting Season.

It is timely to put in the usual word about tree planting. It may be believed that there is no special exhortation needed toward the planting of fruit trees, for the State is already wide awake to the desirability of increasing our production of certain fruits. The experience of the past season has given orchard planting a sharp impulse, and that branch of the subject may be safely left to itself for the present at least.

The planting of trees for ornament, shade and timber is urged as often as the rains come and yet there is still room and occasion for repeating the exhortation. The beautifying of our town streets and county highways, the wise planting in dooryards and around stock yards, and the covering of vacant lands unfit for tillage with growths of profitable timber—



VERNAL FALLS, YOSEMITE VALLEY.

life, a few years ago, by a misstep, which precipitated him some 60 ft. upon the rocks near the foot of the narrow and rickety ladder seen upon the left, near the bottom of the engraving. That ladder is not used now; the more substantial one near by, with railings upon both sides, having been substituted. The view here given was taken in winter, as will be noticed by the icy covering by which the rocks are mostly concealed, and the immense icicles hanging down over the short gallery connecting the two ladder-ways. The engraving is from a photograph by George Fiske, who has his headquarters at Townsend's candy factory, Palace hotel, Market St.

MEXICO.—A miner recently returned from Guaymas says: Here I met Boh. Hatch, an Inyo county man, who had just returned from Guaymas. He reports that country the worst in the lot—no money, no work, and nothing to make it out of. They are principally Mexicans, and all are waiting for the railroad, believing they will make fortunes out of it.

THE Brown's valley mines, Yuba county, have been incorporated under the name of the "Solo Mill and Mining Co.," with a capital of \$500,000, in 50,000 shares of \$10 each, and it is understood that a part of this stock will be placed on the market.

all these should be considered, discussed and acted upon. The State is full of instances of rapid growth of young timber set for wind-breaks on the plains or in patches on the hills to warrant investment in these lines of planting. In the long dry summer the green growths of eucalyptus here and there upon the Contra Costa hills from Berkeley south to Haywards have shone out from their brown and barren surroundings, seeming to command the hill owners to fill the gaps until the whole hill surface should be covered with trees. But though you urge it upon esthetic grounds or clearly demonstrate its success as an investment, still the hill tops remain bare. It is gratifying, however, to note little marks of progress, and one can hope that soon the spirit of tree planting will wider prevail. The great regret must be the time which is being lost. While one hesitates the tree would grow, and before the hesitating man makes up his mind the little plants on his neighbors' lands have become forests.

We trust that the general prosperity of the last year may induce many to make some outlay in the direction of filling the waste places with beautiful timber trees. There is promise of abundant moisture this year and the time could not be better for securing a good start with well-set trees. It would be well if every seedling now lamenting its cramped space in

the boxes of the nurserymen should find room on the hills or in the valleys to put forth leaf and branch and rise to its natural beauty and utility. Let the trees have a chance. They will make glad your eye and carry their benefits to your children's children.

El Dorado Canyon.

A correspondent of the *Silver Reef Miner* writes to that journal as follows, in answer to many inquiries relative to El Dorado Canyon district: Situated in Lincoln county, Nevada, in the range of mountains running parallel with the Colorado river, it extends to the river, a distance of 12 miles. On the north side of the canyon, about midway between the Colorado and the summit of the mountain, is the Southwestern company's mines. This company has a 15-stamp mill, with White & Howell chloridizing furnace, to which they haul their ore at an expense of \$3.25 per ton. This ore, or vein matter, is white spar. R. G. Knox is general manager, and Frank Loughrey, assayer for this company. Almost opposite, on the south side of the canyon, the new district begins, and extends southerly about three miles and westerly about six miles. From Prof. Jennings, who has made a careful study of this district, I learn that the formation is syenite, the vein-filling quartz carrying a chloride.

The most promising mines are the January, Lone Star, Silver Legion, Silver Eagle, Morning Star, Champion, Mohasco, O. K., Gift, Stand-by, with several others on which some work is being done. The first locations were made in this district last January, but little work has been done, as the discoverers could not dispose of the ore extracted. Now, however, that a custom mill is on the way, more work will probably be done in the next four months than has been done since the discovery of the district. There is ready for shipment to the new mill 300 tons or more of ore, the estimated value of which is \$200 per ton, and much more will be on the dumps before the mill is ready to start up. Messrs. Fife, Goodhue & Co. are the owners of this mill, and are pushing it to completion.

The difficulty in obtaining water has delayed prospecting. When this distance, seven to nine miles, to pack water, with the thermometer averaging 114, and the want of everything necessary to prosecute work is considered, it is plain why development has not been more rapid. With the new mill, a store at which to supply from, and the warm season over, we can look to the next six months for developments that will make El Dorado a mining camp in production; as yet it has only been such in name.

Arizona's Mineral Deposits.

We think there are powerful geological reasons why Arizona is the country par excellence of great mineral deposits. It is generally admitted by geologists and scientists who have studied the subject that the occurrence of large mineral fissures, or mineral fissures in large numbers, is associated almost invariably with mountain ranges, and the situation of the principal gold and silver mines in the world bear this out. For example, the Andes in South America, the Sierra Madre in Mexico, the Rocky mountains and Sierra Nevada in the United States, is where the eyes of the world are looking for its future supplies of the precious metals. The greatest mountain ranges on the North American Continent and the upheavals and subsidences which caused them, center in the middle and southeastern portions of our Territory. This can be plainly seen by any one examining a good map of the Western Hemisphere. The great Andes range traverses South America, and with occasional breaks comes up through Mexico into Southeastern Arizona, where it divides into the Sierra Nevada on the west, Mogollon and Wasatch ranges in the center, and the Rocky mountains on the east. Now, the point of division is Arizona, where the prophetic eye of Baron von Humboldt saw the indications and foretold the wonderful deposits of the precious metals, which are now opening out, although as yet we are but scratching the surface and our output of bullion comparatively small to what it will be when we really get down to, say, 1,000 ft. from the surface. Then it will be found that our lodes have solid bodies of rich milling ores which can be opened out and made to yield quantities of bullion equal, and possibly superior, to anything hitherto produced on the globe. —*Globe Chronicle*.

UTILIZING OLD WASTE DUMPS.—The *Silver State* says: Messrs. Harris & Bose, practical men, who thoroughly understand the leaching process, have made arrangements with the owner of the Gem mine, 18 miles south of town, in Sierra district, to work the mine and the ore on the dump. They are now erecting leaching works at the mine, and they intend to lift the dump and get all the rich chloride ores which it contains, to work. Mr. Harris, who has visited several mines in this county, says there are thousands of dollars in many of the dumps which can be saved by the leaching process. This is particularly the case where there are chloride ores, as they can be leached without roasting. He says the cost of sorting the dumps and separating the silver does not exceed \$4 per ton, where the ore can be treated without roasting. They think they will erect a small mill for crushing ore at the Gem next spring.

THE ENGINEER.

Unsinkable Ships.

A party of gentlemen interested in steam navigation lately met at North Woolwich to inspect a steam launch built on Mr. James Long's unsinkable system. The principle consists in attaching to the sides of the hull of a vessel a series of flat air-tight metallic cylinders or drums, the inner heads of which are built into and form part of the framing and inner skin of the vessel. These drums project on either side of the ship and are cased in, the under sides of the casing normally resting upon the surface of the water and becoming slightly immersed under a load. This results in a light draft with great freeboard, and it is claimed that a greater stability under canvas and a higher rate of speed under steam or sail are thereby attained, besides the advantages of greater cargo capacity, economy in construction, and, above all, unsinkableness, however damaged by collision or otherwise. The launch in question, which is only experimental, is steel built, 37 ft. in length, 6 ft. in depth, and 5 ft. 8 inches beam internally. She has 7 cylinders fitted on each side, each cylinder being 3 ft. 6 inches in diameter and 1 ft. 8 inches deep, and which give her a width of nearly 9 ft. over all. She draws 2 ft. of water without her load, and has a freeboard of 4 ft. A short run was made with the vessel, a fair rate of speed being attained, while its unsinkable character and other points were demonstrated by Mr. Long by means of a model vessel.

INFLUENCE OF MISSISSIPPI IMPROVEMENTS.—The effect of the jetty improvements at the mouth of the Mississippi river, in extending the commerce of the Mississippi valley, is already very great. Since the beginning of this year, St. Louis has shipped to Europe, by way of New Orleans, twice as much grain as passed out of the country by that route during the last 10 months of last year. The shipments down the river would be still greater were it not for the lack of barges to carry the grain. It is said that a fleet of boats are being built to supply the want. In regard to the improvements in progress on the Upper Mississippi, it is reported that the commission having them in charge has finished the examination of that portion of the river between St. Paul and St. Louis, a distance of 700 miles. Great improvement was found in the channel, especially for low water navigation, the result of the improvement works in process of execution by the corps of engineers. These works consist of low wing-dams of brush and stone, projecting from the shore for the purpose of narrowing the water way, supplemented by a brush and stone revetment of the opposite bank and elsewhere if necessary wherever the contraction produces caving.

AN ENGLISH ENGINEER ON AMERICAN LOCOMOTIVES.—Mr. R. M. Brereton, C. E., writing on this subject, says: "I argue that the greater duty done by the American motor is due to the better design and the better system of working the locomotives. The American builder excels in the system of framing and counter-balancing, and in the designs of crank axles, etc., so that the engine may run remarkably easy and without jar round sharp curves, and work not only the light roads, but also diminish the wear and tear on the solid roads, and at the same time increase the effective tractive force. The English engine is a very heavy affair, and in running it not only wears and tears itself very rapidly, but also the roadway, and it greatly, by its unsteadiness and jar, fatigues the drivers and firemen. I have ridden hundreds of miles on engines in India, in England, in France, and in the United States, and I have always found the American engine most easy and comfortable, but I never did the English or the Continental engines. It is almost impossible to give these engines their full hauling power, simply because the greater portion of the weight cannot be thrown on the driving wheels."

A LONG BRIDGE.—A large undertaking has recently been completed in Russia, in the shape of a long bridge over the Volga, on the Syoran and Orenberg railway, connecting the cities of Syoran, in the government of Simbirsk, with that of Samara. The width of the river is nearly a mile, and as it is liable to the occurrence of heavy spring floods, the piers (of which there are 14 altogether) had to be built 100 ft. above mean water level, the depth of the river being more than 50 ft. The girders, 364 ft. long and 20 ft. wide, were all riveted and put together on the right bank of the river, and then floated to their position. The whole cost of the bridge was 7,000,000 silver rubles, and it is worthy of mention that it was completed without loss of life or accident of importance.

TEST OF THE MISSISSIPPI OUTLET.—The Dominion line steamer *Montreal*, bound for Liverpool, passed the jetty November 17th, with the largest cargo ever taken from New Orleans. It consisted of 6,659 bales of cotton, 42,658 bushels of corn, and 2,000 packages of miscellaneous cargo, the total being equivalent in bulk to 9,565 bales of cotton.

TUNNELING THE SIMPLON.—One hundred and thirty French deputies have signed M. Renaul's proposition for a grant of 50,000,000 francs for the construction of a tunnel through the Simplon mountain. It is stated that Italy and Switzerland have promised subventions.

USEFUL INFORMATION.

DRY ROT IN HOUSES.—At the annual meeting of the Cryptogamic Society of Scotland, commenced in Glasgow recently, a paper by Mr. Young, architect, of Perth, was read by the Secretary, Dr. Buchanan White, on "Dry Rot Fungus in Houses, and the Best Means of Eradicating it." The following were the conclusions at which Mr. Young arrived: 1. That wood is necessary for the root or first production of the fungus. 2. That the wood, after a time, gets exhausted of its nourishment for the fungus, and when this is the case the plant attached to it dies. 3. That if it has wood for its root its branches will luxuriate even in the heart of a well-built dry rubbish wall; but when the wood at the root is exhausted it dies in the wall. 4. That where the conditions are favorable, free ventilation is not against its growth; on the contrary, a draft aids in dispersing its spores. 5. The cure is to eradicate it as far as possible by burning the soil, applying a flame to the walls, and removing every particle of wood from its locality, and substituting stone, iron, or cement. 6. That upon perfectly dry and healthy wood it would not readily take root, but if it gets good root in dampish wood, its growth will ramify over dry fresh wood and prey upon and destroy its tissues, thus ruining it for all structural purposes.

LOSSES BY FIRE.—It is estimated that the total annual losses of insured property by fire, throughout the world, average nearly \$200,000,000. Add to this the annual destruction of uninsured property, and we should probably have a total amounting to quite double these figures. How great the loss, how severe the tax upon the productive industry of mankind, this enormous yearly destruction amounts to, will come home to the minds of most readers more directly if we call attention to the fact that it just about equals the value of our total wheat crop during a year of good yield. And it is a direct tax upon productive industry everywhere, because, although here and there a nominal loser, fully insured, has only made what is sometimes called "a good sale" to the companies holding his risk, this is only a way of apportioning the loss whereby the community at large become the sufferers. Thus it is that we find all ably-managed insurance companies earnestly endeavoring to make it plain to the public how fires should be guarded against, or most effectually localized and controlled when once started.

SAVING ALKALI IN PAPER MANUFACTURE.—T. L. Snyder, of Phoenixville, Pa., is now putting in an alkali or soda ash reclaimer for one of the paper companies at Turner's falls. At present, the alkali, after performing its office in the digester, runs off into the river a sheer waste. The entire process is as follows: The alkali having reduced the wood in the digester, is cleared from the pulp by water process; the mixture, containing alkali holding the soda ash in solution, certain vegetable matter retained from the wood and the water. The whole goes back to the reclaimer, where the vegetable matter is burned out and the water evaporated. Some more soda ash is added and the alkali goes again to the digester to again produce pulp. Thus an endless round of duty is continued. About 85% of the soda is saved. It costs five mills per lb. to reclaim it, and it is worth two cents a lb. This establishment at Turner's falls contains two reclaimers with a capacity for reclaiming 12,000 lbs. of soda ash each day. The works will be done and ready for operation in about five weeks.

THE POTATO BUG UTILIZED.—The long suffering and much vilified potato bug has at last vindicated his right to exist by proving his usefulness. No longer will the cheerful cochineal and mercenary madder monopolize the furnishing of the scarlet dyes that brighten our fabrics. Alongside of these aristocratic and costly pigments the lowly Colorado beetle will take his humble place, and plunging into the dyer's kettle will slowly dissolve himself into a beautiful scarlet dye. Thus shall he become precious, and the Granger, heretofore his bitterest foe, shall foster and care for him as a most precious product.

GUTTA-PERCHA CEMENT.—This highly recommended cement is made by melting together, in an iron pan, two parts of common pitch and one of gutta-percha, stirring them well together until thoroughly incorporated, and then pouring the liquid into cold water. When cold, it is black, solid and elastic; it softens with heat, and at 100° Fahr. is a thin fluid. It may be used as a soft paste, or in the liquid state, and answers an excellent purpose in cementing metal, glass, porcelain, ivory, etc. It may be used instead of putty in glazing windows.

REMOVAL OF IRON MOLD.—D'Arcet applies to the spot very dilute sulphuric acid and a solution of yellow prussiate. The spot of Prussian blue thus produced is removed by washing. Another method proposed is to rub gently with cream of tartar, moistened and in powder, and then to wash; or apply sulphuret of sodium, followed up by dilute muriatic acid; then to wash with clear water, and finally with weak soap lye.

CHROMATE TANNING PROCESS.—Heingerling proposes to use sulphate or chloride of chromium, either alone or in addition to the chromates. Chloride of aluminium may be advantageously used instead of alum or sulphate of alumina.

REMOVAL OF GREASE SPOTS.—Fatty oils have a greater surface tension than oil of turpentine, benzole, or ether. Hence, if a grease spot on a piece of cloth be moistened on the reverse side with one of these solvents, the tension on the greasy side is larger, and therefore the mixture of benzole and fat or grease will tend to move toward the main grease spot. If we were to moisten the center of this spot with benzole, we should not remove it, but drive the grease upon the clean portion of the cloth. It is, therefore, necessary to distribute the benzole first over a circle surrounding the grease spot, to approach the latter gradually, at the same time having blotting paper in contact with the spot to absorb the fat immediately. Another method, namely, to apply a hot iron on one side, while blotting paper is applied to the other, depends upon the fact that the surface tension of a substance diminishes with a rise of temperature. If, therefore, the temperature at different portions or sides of the cloth is different, the fat acquires a tendency to move from the hotter parts toward the cooler.—*The Pharmacist*.

A MAN OF NERVE.—A thrilling accident occurred at the American Iron Works, in Pittsburgh, on the 2d inst. While Robert Moore was at work at his rolls his catcher failed to seize with his tongs a bar of white-hot iron which had been placed between the rolls. The iron twisted itself thrice around the roll, forming a "collar." The catcher struck the iron, when there flew off a piece in the shape of a ring, with a stem 20 inches long running off at right angles to the circle. The band flew back and fell around Moore's head, resting on his shoulders. Quick as thought he grabbed the long stem with his tongs and the white-hot ring with his hand, and with steady nerve and gentle movement lifted the fiery thing from his shoulders. His face was badly burned and the flesh of his hand was cut to the bone. After the iron had cooled he put the ring over his head—it was but two inches larger in diameter than his head.

PROTECTION AGAINST MOISTURE.—In order to prevent the rapid deterioration of wooden vessels when exposed to moisture, they may be thoroughly dried and then painted with two or three coats of a solution of paraffine in benzole. If the vessels are to be subsequently exposed to heat, a final coating of linseed oil varnish, or soluble glass should be given. If soluble glass is used, the vessel should be subsequently washed with dilute hydrochloric acid.

STEAM BOILER CEMENT.—Mix two parts of finely powdered litharge with one part of very fine sand, and one part of quicklime which has been allowed to slake spontaneously by exposure to the air. This mixture may be kept for any length of time without injuring. In using it, a portion is mixed into paste with linseed oil; or, still, boiled linseed oil. In this state it must be quickly applied, as it soon becomes hard.

GOOD HEALTH.

Absence of Mind a Sign of Incipient Mental Disease.

It is essential to skill that the muscles of the body should work unconsciously; but the moment they assert, as it were, their independence of self-consciousness, and prompt to the initiation of efforts outside of what they have been taught, a diseased condition is begun which we call "absence of mind." Such a habit begins in little things, more generally by an omission than a commission. Thinking of something else while dressing, a part of the toilet is overlooked, the necktie is forgotten, the wrong coat is put on, the hair is unkempt. Soon, as the habit increases, absurd and even harmful acts are committed. The collection of anecdotes are full of such follies. We know of an able young lawyer, who, instead of pouring a tonic from a bottle on his desk, carefully emptied the ink from his inkstand into a spoon and swallowed it. Another, an ex-Attorney-General of the United States, went on a fortnight trip to attend an absorbing legal case. His wife packed a half dozen shirts in his portmanteau. On his return there were no shirts visible. Pushing her inquiries she found that her husband had regularly donned a clean shirt every other day but had forgotten to take off the soiled one, and now returned wearing the whole half dozen. An authentic anecdote of the great political economist, Adam Smith, tells us that when called upon to sign a contract, instead of writing his own name, he made an elaborate imitation of the signature of the other party which had already been affixed. Such incidents tend to depreciate a man, though perhaps unjustly, in the opinion of those with whom he does business. They become also a grave annoyance to the individual himself. In a sense they are mental weaknesses which, pushed to a certain degree, pass into mental diseases. Senility and insanity are not unfrequently marked by automatic actions, carried out without the will or consciousness of the doer. The absent-minded one, like the sleep-walker, performs actions without the knowledge of them, and neglects duties which are pressing. Justly, therefore, it is a source of anxiety with every thoughtful person when he finds himself falling into this bad mental habit. It is usually gradual in its onset, steal-

ing over one in moments of intense occupation. Unlike other mind-weaknesses, it is not the foe of the idle man so much as the busy one. Yet habits of reverie and day dreaming may, also, bring it about. Those who feel this habit creeping over them will do well to make an early and special effort to resist it. It can be conquered by a habit of attention, and by ever self-chiding when the mind yields to it.—*Medical and Surgical Reporter*.

PHYSICAL EDUCATION.—Absolute health is only attained when the body is equally developed in all its organs and members. The man with muscles of steel and a diseased heart cannot be said to be in good health, and diseases of stomach, heart and nervous system are often—it may even be said usually—produced by that system of development known as training. At a recent rowing match in Philadelphia, two plucky lads in contesting boats fainted as soon as the race was over. Their condition, which was apparently good, was actually abnormal, and their systems gave way because the strain which their muscles met was too great for their vital functions. Recently a similar but more serious calamity occurred at Sag Harbor. A Brooklyn lad who had taken part in a pedestrian contest, when removed from the track, fell down dead. He had prepared himself for walking and running, and depleted his vital organs to build up his limbs. When the strain came the impoverished and most important part gave way. The severe muscular exercise of college athletes has carried off many fine young men by consumption, heart disease and other disorders, directly traceable to the absurd overwork required of their bodies. There is a limit of human endurance. That limit is reached when the body is impaired in one quarter to benefit special organs. The severity of the test by which athlete prizes are won seems designed rather to award the laurels to him who is the least healthy, because more unevenly developed, than to the really best man.—*Brooklyn Eagle*.

THE BODY NEVER IDLE.—The most inveterate idler cannot prevent his body from working; that is clearly impossible; the body must keep hard at work or it will die. Suppose the stomach refused to work within ten minutes after a hearty dinner, the man would die in convulsions in a few hours; or cholera or cramp colic would rack and wreck him. Supposing the pores of the skin—meaning thereby the glandular apparatus with which they are connected—should go on a "strike," he would in an hour be burning up with fever; oppression would weigh upon the system, and soon become insupportable. Suppose the liver became mulish, the appetite would become annihilated, food would be loathed, torturing pains would invade the small of the back, and the head would ache to bursting. And so with all the functions of the body. How wonderful the beneficence that enables us to keep this complicated machinery in order by the pleasant process of eating and drinking.

A NEW WAY TO TREAT DIPHTHERIA.—Quite a discovery in the treatment of diphtheria has been made recently. A young man whose arm had been amputated, was attacked with diphtheria before healing took place; and instead of the matter incident to that disease being deposited in the throat, the greater portion appeared on the wounded arm, and the diphtheria was very light and easily managed. Dr. Davis profited by this, and in his next case of diphtheria blistered his patient's chest, and on this blistered part the chief deposits appeared. This was also an easy case of the disease. The theory is that diphtheria usually appears in the throat because of the thinness of the lining of the throat. Hence, when the blister breaks the skin upon the outer part of the body, the disease appears there.

THE WHOOPING COUGH CURE.—The Detroit *Free Press*, in speaking of the benefit derived by children suffering from whooping cough from frequent visits to the purifying house of a gas works, says: "The children are sent there usually by direction of the family doctor to inhale the ammonia which arises from the purifying boxes." As a matter of fact, it is not ammonia that does the business, or they might inhale it at home, but certain substances found in coal tar called phenol or carbolic acid and cresol. Cresol is closely related to carbolic acid, and is sold for use in cases of throat difficulties, under the name of cresolene. It may be vaporized in the patient's room, and he has all the virtues of the purifying house, with none of its unpleasant features.

CONVERGENT SQUINT.—Dr. C. A. Bucklin, in an article in the *Medical Record*, on the cause and treatment of squint, expresses the opinion that every squinting eye that is not due to paralysis of a muscle can be straightened. In convergent squint the use of one eye is usually lost; consequently its earliest symptoms should receive prompt attention. Dr. Bucklin has had the advantage of examining over 200 cases of squint, and illustrates his text with a few of the more interesting ones to show the success that has attended the treatment which he therein recommends, that of tenotomy, or division of the tendon of the abnormally shortened muscle.

AN EMETIC FOR INFANTS.—A correspondent of the *British Medical Journal* states it is his experience, that half a teaspoonful of glycerine acts as a simple and efficient emetic for infants.



B. EWER..... SENIOR EDITOR.

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The Week.

Christmas week comes but once a year, and this year it comes with unusual welcome, as it has brought with it a most abundant and continuous rain. For the hydraulic miners the rain is one to make them all rejoice. Some of the farmers may have a little too much, but generally speaking the copious rainfall thus early ensures an abundant and prosperous year for California. With spring rains, full crops are assured all over the country.

We print this week a 24-page edition of the PRESS, and desire to call the special attention of our readers to its contents, embracing a large amount of original and condensed selected matter of interest and value. The index, which will be found on the last page, shows that the close of the volume has come. To those of our readers who file and bind the PRESS—and we hope they are many—the index is indispensable.

We hope that all our readers who are with us this year will continue with us next. And speaking of that reminds us to remind them that New Year is a good time to send in subscriptions. We will not urge our claims in this direction, but let our work speak for us.

And while congratulating ourselves on concluding our labors for the year, and assuring our readers of renewed exertions, we must not forget to wish to all, "A merry Christmas and a happy New Year."

Ourselves.

We hope that a perusal of the MINING AND SCIENTIFIC PRESS will convince anyone into whose hands it may fall, that if he is not a subscriber he ought to be. People on this coast interested in either mining or mechanical pursuits, or desiring to keep posted on the scientific progress of the age, should give their support to the journal which furnishes them with information on these topics.

A glance at the copious index on the last page of this issue will show the variety of topics which have been discussed in the half-yearly volume, which this number closes. It is unnecessary to call attention to special articles—they speak for themselves. We have of course given prominence to such information as would interest the miner, metallurgist and mechanic, as we shall continue to do. We propose in the coming year to improve the PRESS very materially. The widespread interest in mining matters which now exists, has very much broadened the field.

It has brought numbers into mining who will eventually benefit it. Large tracts of undeveloped country are now being opened, and many old districts are being re-worked. To keep posted in the improvements being made, those interested in mining matters generally, should by all means read the PRESS carefully. We keep close watch of all improvements at all likely to be of value or benefit to our readers.

We close our 41st volume this week. The PRESS is the oldest mining journal published, not only on this coast, but in the United States. Our files form a complete historical record of the progress of precious metal mining on the Pacific coast of the United States. We are familiar with the records of the various districts, and of the various metallurgical ventures made from time to time, whether at home or abroad, enjoying in this respect facilities which more recently established journals do not have. The long experience of the publishers and editors in conducting a technical journal, must result in benefit to its readers. All we ask is the co-operation and assistance of those to whose interests we are devoted, and we feel sure that both will be extended to us in the ensuing year as in the past years.

Nomadic Miners.

The dull and slack times which prevail in Nevada just at this time, as well as in parts of California, have been the cause of many miners "pulling up stakes" and starting out for new fields. These men are leaving the big centers like Virginia and Eureka, as well as the less important camps. Most of these miners are moving south to the newer districts of Arizona and New Mexico, where they hope either to find claims for themselves, or to get work from the companies. This exodus has continued so long now that Arizona, at least, must be pretty full of miners, and the overflow will go into New Mexico. Some of the papers down there are already saying that there are more miners than work can be provided for, unless they come "fixed" to prospect. Men who must have work, however, are more plentiful than is pleasant. Those who are doing half way well had better stay where they are, unless they can afford to prospect, for neither New Mexico nor Arizona are lands flowing with milk and honey. A good many miners down there are advising their friends to stay at home and let well enough alone. Some miners are also getting ready to go over to the Wood river country and vicinity, Idaho, which is just now attracting a good deal of attention. Montana will also soon attract a great many. The railroad prospects are good for her, and there are wide extents of unprospected country within her borders which will furnish work for many miners. A peculiarity of the Wood river country is that the miners can sell their ore as they take it out, in quantities from a ton up. The ledges pay from surface down.

Going to any of these places, however, with just enough money to get there and depending on finding work the next day after arrival is a poor prospect. Miners are proverbial for their nomadic habits, and also for improvident habits, and not many of them can afford to rest idle for several months at a time. Those with any sort of prospects had better remain where they are for a while, rather than wander around blindly in the hope of something turning up because the camp or the country is a new one.

THE BARBEE & WALKER, Silver Reef, has paid in dividends, \$60,000; the Leeds, Silver Reef, \$78,000; the Stormont, Silver Reef, \$135,000; the Horn Silver, Frisco, \$200,000, and the Ontario, Park City, \$3,100,000. These are the only dividend-paying mining stocks of Utah on the stock boards.

Hydraulic Mining.

With our hydraulic miners the past has been a fairly prosperous year. Though late in getting to work, on account of the severity of the preceding winter, whereby the water was frozen up and the ditches filled with snow and ice, still the season proved, on the whole, an extremely favorable one, water being abundant and holding out until an unusually late period in the summer. Several of the larger companies might be said to have had water throughout the whole year, not having discontinued gravel washing entirely until the month of November. This only left them time enough to clean out their ditches and put their claims in good working shape before the advent of the recent winter rains, so short an interregnum of active operations having perhaps never occurred before in the history of hydraulic mining.

This branch of mining has, in fact, been improving somewhat for a number of years past, a result due to a variety of causes, such as greater experience gained by those engaged in it, to the employment of improved apparatus, increased water supply, better facilities for disposing of the tailings, etc.; no year having passed without bringing with it material gains in each of these respects. In nothing has this pursuit been so much advanced as through the constant enlarging of old and the building of new ditches, and the construction of reservoirs for storing and retaining for future use large quantities of water that before ran to waste. Through these additional aids the capabilities of this class of mines have, within the past few years, been increased fully 20%.

Then, the productive capacities of many of these properties have, of late, been largely augmented through the driving of lengthy bed-rock tunnels, whereby the miners have been enabled to reach and run off the deeper lying and richer strata of gravel occupying the old river channels. As nearly all these structures have been attended with a heavy expenditure of time and money, they have severely taxed the financial resources of the companies driving them. But these companies will, in most cases, derive from these works great benefits, besides enjoying for many years, and perhaps perpetually a respite from further burthens of this kind. Being so highly favored as regards water supply, most of the leading hydraulic companies in California have, during the year just closed, made large clean-ups. As a consequence, dividends with the majority of them have been frequent and liberal; the profits arising from this style of mining being in most cases large, comprising generally from 50% to 70% of the gross production made. In some instances the net earnings realized instead of being disbursed to the owners in the shape of dividends have been expended in the purchase of additional ground, in the construction of ditches or in effecting other needed improvements.

This description of mining, though not confined to California, has in this State reached its greatest perfection and is here practiced to an extent and on a scale not elsewhere approached. The most active sites of this industry have during the year, as heretofore, continued to be in the neighborhood of Dutch Flat and Gold Run, on the San Juan ridge, about Smartsville, at and near Cherokee, Butte county, and along and in the districts adjacent to Slate creek. While the deposits on the Forest Hill divide, Placer county, are, in point of magnitude and richness, second to none elsewhere, the insufficient water supply restricts hydraulic mining in that locality to a comparatively narrow limit.

In Trinity, Siskiyou and Del Norte counties, occupying the northwesterly angle of the State, the business has been prosecuted over a large extent of territory and with a good measure of success, many of the conditions there, such as ample water supply, abundance of gravel and immunity from the vexatious debris question, being extremely favorable. But the old Placene river channels proper, with their immensely rich bottom deposits, do not there occur, or at least have not as yet been met with, showing the affluence and strongly marked features that characterize this class of deposits in the more central mining counties of the State. Nevertheless, this northwesterly lying region presents through the above mentioned and other natural advantages a better field than can perhaps at this time be found anywhere else for embarking capital in this particular branch of mining. Gravel-bearing lands there are comparatively cheap, while water can, as a general thing, be introduced upon them by means of short and inexpensive ditches and under almost any amount of pressure desired; nor is there often much trouble about outlet for tailings, the most of these being discharged directly into the strong currents of swift-running rivers which sweep them down stream and leave them where they can neither obstruct mining operations nor cause damage to other interests. It should be observed, however, that these advantages are to some extent counteracted by the increased cost of freights, as well as of subsistence and labor in these remote and inaccessible sections of the State.

As regards the troublesome question of disposing of the hydraulic tailings or debris in localities where this material has caused or is likely to cause damage to farming lands or obstruct navigable waters, while it has not yet

been fully settled; still, such progress has, during the past year, been made toward that end as promises to ultimately effect its partial and perhaps full and satisfactory attainment. Both the State and the general government are now moving in this matter in a way that will, it is to be hoped, produce harmony of action among all parties concerned, if it do not fully protect every interest involved. Already litigation between the farmers and miners has been checked, with some prospect that it will be stopped altogether, as we trust it will be, seeing it can hardly be expected to subsolve any useful end to either of the parties litigant, if persisted in.

Viewed as a whole, the condition and prospects of hydraulic mining in California may be considered tolerably good. While subject to a good many difficulties and hindrances, it is probably as free from these as most other branches of the business. Certain it is these obstacles are, through increased experience, being constantly diminished, the results reached of late years being more uniform, and every way more satisfactory than during the earlier stages of this industry.

Assessment Work on Claims.

The year during which work on mining claims must be done to comply with the United States regulations, begins on the 1st day of January. This is required by the amendment to the laws which was passed in March, 1880. We have published this several times, but here it is again, to make sure no miner will miss it.

"Provided, that the period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location of such claim, and this section shall apply to all claims located since the 10th day of May, 1872."

Under the old law the year began from date of location. Now, however, the miner must begin his work on January 1st, to expend the \$100 on "labor or improvements."

A claim located October 1, 1879, requires the expenditure within the year of 1880, and whatever may have been expended during 1879 will not answer the requirements of expenditure in 1880. It appears by reason of the change made in the requirements of the act of May, 1872, by the amendatory law, that a claim located on any date subsequent to the 1st day of January, 1879, requires no further expenditure during the remainder of that year than is made necessary by the local laws.

We hear that in several camps people are ready to jump claims on Jan. 1st, if the miners are not present. People have gone from this city up country to relocate claims if the original owners are not on hand. In one camp, a band of men have organized to go out at 12 midnight on the last day of the year, and relocate those claims where no one is at work. This kind of game, however, will not work, and if the owner was at hand on his claim at the usual morning working hour, his rights would no doubt be protected by the courts if it came to a contest.

It behooves all claim owners, however, to look out for their property and see that it is not relocated.

THE MUSSEL SLOUGH CASE.—The jury in this case after being out all night, rendered a verdict on Thursday morning of "guilty of resisting the United States Marshal, as charged, but not guilty of conspiracy." The defendants were remanded to custody to await sentence, with bonds raised to \$5,000 each. Counsel for defense gave notice that they should move for a new trial on questions of law and fact. Judge Sawyer fixed the second Monday in January as the time when he would hear arguments on motion for a new trial. The penalty, as announced by the Court, could not exceed a fine of \$3,000 or one year's imprisonment; or both fine and imprisonment.

MINTING CHARGES.—Mint Director Burchard has advocated before the House Committee on Coinage the reimposition of melting and coinage charges. This accords with the recommendations of Secretary Sherman, who suggested in his annual report the propriety of imposing a melting charge in all cases of deposits of bullion, either for coinage or refining. As to the charge for coining, the Secretary says that experience shows that, other circumstances being favorable, a coinage charge does not prevent a country from securing the coinage of the coin the condition of the foreign trade will permit it to retain.

MARIPOSA ESTATE.—The case of Joseph A. Donohoe vs. Mariposa Land and Mining Company of California, for foreclosure of mortgage for about \$250,000, has been decided in New York by Judge Evans in favor of plaintiff. The defence consisted of attempts to repudiate various previous settlements made by Mark Brumagim and one Stilwell, and on a pretended extension of time for payment of mortgage notes.

COPPER.—We had expected to give quite an extended article on copper in this issue, but will have to postpone its publication until next week on account of the crowded state of our columns.

The Richmann Drill.

The Richmann rock-drill is the most recent of the inventions designed for boring rock, and is the most improved. It was devised by Henry Richmann, of this city, patented by him through the MINING AND SCIENTIFIC PRESS Patent Agency, and is a remarkably perfect tool, being one of the most complete and ingenious inventions ever perfected on this coast. It is manufactured in our city by the Richmann Rock-Drill and Compressor Co., the same company also manufacturing the Richmann air compressor, which we illustrated and described in the PRESS of December 4th. Although the tool is of recent invention it has been very thoroughly tested, and is now doing practical and successful work in several mines on the coast. Such is the perfection of the mechanism that, in addition to its other features, the manufacturers are confident they can do the same work at more economical figures than other drills.

As before stated, the device is a very ingenious one, but is somewhat difficult to describe without the aid of detailed engravings. We shall endeavor to convey as clear an idea of the peculiarities of the construction of the drill as possible, without going too closely into details. It is well to premise, however, that this is worthy of the close attention of mining men, as the tool is one that has a great many favorable points, and which is doing successful work. Though a description may give the idea that it is complicated, such is not the case, as the desire and aim of the inventor has been to simplify the parts so as to avoid liability of damage or breakage, and so that in case of breakage any ordinary blacksmith or mechanic may repair it.

Before going into any description of the valve mechanism it is as well to describe the

Support and Clamp

For the drill, the method of connecting the case or carriage, carrying the cylinder, to the column, being novel, as well as the clamp for holding it in position on the column.

The semi-cylindrical case or carriage, in which the cylinder and operating mechanism of the drill are supported, has on its side a peculiarly-shaped hollow, bevel-edged trunnion, by which it is attached to the column or tripod. To connect the drill case to the column, a ring is placed around the column loosely, upon each side of which are bolts. Upon the bolts is fixed a peculiarly-formed clamp, made in two halves. By the

Peculiar Construction of the Clamp

And ring the inventor is enabled to keep the drill very close to the column and overcome an objectionable feature which is common to most rock-drills—that of the drill standing too far from the column. In a large drill they are now enabled to bring the drill-carriage within one inch of the column. The vertical and horizontal adjustment of the drill-carriage and drill is made by loosening the nut and sliding the clamp with its ring up or down, and moving the drill-carriage by its trunnion on the socket. In this way the drill may be moved or maintained in any position.

The adjustment of the drill-column itself as to decrease or increase of its length to adapt it to a shaft or tunnel and fix it in place is made in a peculiar manner. The column itself is hollow, so that the extension column or leg may move up and down inside of the column. Inside of the column is a screw-rod, and the extension column or leg being itself hollow and threaded inside, it is screwed up or down on the screw-rod by inserting a lever in the hole at the lower end of said leg.

The lower end of the column is split, and encircling this split is a spring-clamp, controlled by a screw. To

Increase the Length of the Column

To fix it in place between the floor and roof of the drift, a lever is inserted and the extension column or leg screwed down on its rod, thus being forced out of the column. When the extension-column is drawn out sufficiently to fix the column, by forcing the pointed leg into the floor, and the dogs at the upper end into the roof, the screw is turned and the spring-clamp tightened around the split end of the main column. This makes the lower end of the main column bind firmly around the extension or leg, which is thus prevented from turning and is fixedly held in place. The column can be extended two ft., is easily secured and perfectly steady.

Ordinarily a screw and nut are need to tighten up the extension-column, and the leg or extension-column is externally threaded, to screw up into the column. When, therefore, this leg is screwed out, the threads become exposed to injury. The nut is apt to get loose by the jar of running the machine.

In the construction of this drill-column the extension or leg has its threads in a position

where they are never exposed to get injured, and it is possible, moreover, to have a short column and still extend it quite a distance. When the clamp is tightened up, the leg is kept from turning round, and is better than a nut, since it will never jar loose.

So far we have confined ourselves to the description of the support and clamp. The drilling apparatus itself next claims our attention. The engravings given herewith give an idea of the external appearance of the drill and of the column and clamp, but the operating mechanism cannot conveniently be shown.

The cylinder and operating mechanism of the drill are supported in a case or carriage, which is clamped to the column as before described. On the side of the case is a

Feed-Screw

Chamber, enclosing the feed-screw and protecting it from injury. In the ordinary method of fitting feed-screws to drills, the screw is liable to become loose by the continued back and forth motion of the drill, owing, probably, to the defective means of securing the screw itself, the bearing of which becomes worn by the jar. This defect is overcome by forming, on the lower end of the screw, several annular V-shaped flanges, fitting in correspondingly-shaped grooves, in a little box which may be adjusted by a key, the key keeping the box ahead and preventing it from jarring. The screw is not, therefore, liable to become loose.

cause it to grip the drill-tool for the whole length of said clamp, but at no one point more than another.

The screw-threads on the sleeve are so formed that the rotation of the drill with its attendant jar tend to screw it tighter instead of loosening it, and, being internally threaded in two directions, it also acts as a jam-nut to hold the clamp to the drill-head. The drill-tool is thus held rigidly in place and has a long bearing, but is readily removed by loosening the clamp, which cannot jam, owing to the peculiar construction described.

To tighten or remove the drill it is necessary to put a pin or lever in one of the holes of the drill-clamp and hold it, and by turning the sleeve when the clamp is held still, the drill can be either removed or tightened, according to the direction in which the sleeve is turned.

The most novel feature in the whole device is the

Operation of the Valves

Controlling the admission and emission of steam or air to the piston, and the means by which the piston itself is operated, and also the method by which both valve and piston are cushioned.

The cylinder is not bored the same size all the way through, since the piston is made of two diameters, to which the cylinder must be accommodated.

Usually in rock-drills there is not as much force exerted on the piston on the back stroke

ment of the ports in combination with the double-headed piston valve. The method by which the

Rotary Motion of the Drill

Is imparted, is such that a very small rotary movement can be made, while, at the same time, plenty of grip is given to the ratchet, etc., by which it is accomplished.

The teeth of the ratchets are made in a peculiar form to adapt themselves to take up wear. Between each tooth is a slot, cut deeper than the tooth. It is on the beveled faces of the teeth themselves that the wear occurs from constant friction; but the faces of the teeth formed in this manner may wear until the lower edge of the tooth is worn down to the bottom of the slot before the point of the tooth will touch and be worn off.

In the working of the ratchets, when the teeth disengage, the point of the upper tooth will not drop from the point of the lower tooth in a vertical line in taking a new grip, but will jump slightly. In doing this in this improved form of tooth the point of the upper one will catch on the back of the slot and be directed against its disengaging tooth without much slip. In this way all wear is taken up automatically, and the teeth are sure to engage.

As the piston is moved back by the air or steam, the drill-head and drill are rotated by the pins or lugs in said drill-head sliding in the

diagonal slots in the ratcheted sleeve, the sleeve itself being held by the ratchets of one of the sections engaging with the sleeve-teeth. The drill-head, piston-rod and piston are therefore turned slightly, so that at the forward stroke the cutting-edge of the tool in the drill-head is presented in a new position in the drill-hole. The springs under the sections keep them engaged at all times with the teeth of the ratcheted sleeve. A good firm grip or engagement of the ratchet-teeth is insured by this arrangement, and when the turn of the drill and head is only slight there is no danger of the teeth missing, since with two sections a turn of only half the width of a tooth will admit of an engagement with one or the other of the sections.

Two sizes of the drill are now made. No. 1 is a light mining drill, 2½-inch cylinder, and weighs about 135 lbs. It is adapted to all kinds of work, and will be found particularly useful in working in narrow stopes, being small, compact and powerful, making 1,200 strokes per minute and feeding 18 inches.

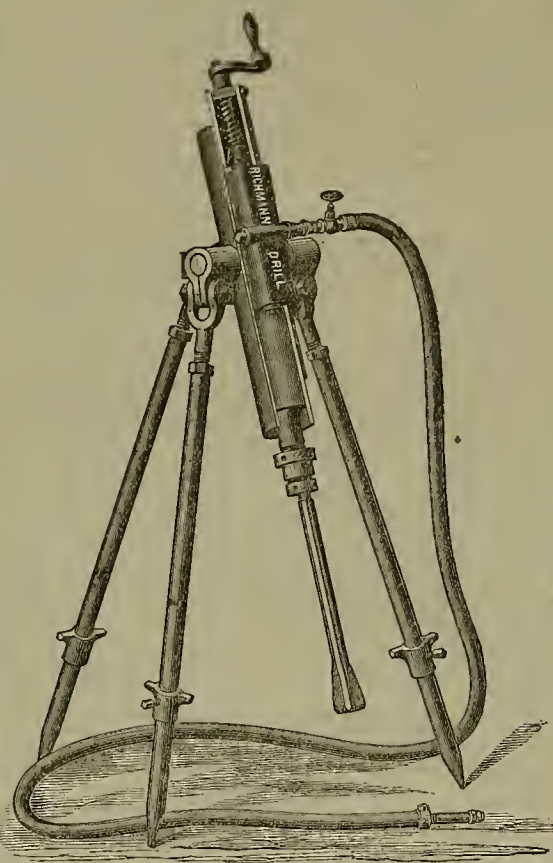
No. 2 has a 3-inch cylinder, and weighs about 155 lbs. It is more powerful than No. 1, and is adapted for heavier work. It will drill holes 2 inches in diameter and feeds 20 inches. The working parts are all under the cylinder.

Those who are interested may see this drill at work at the manufacturer's, whose address is 27 Stevenson street.

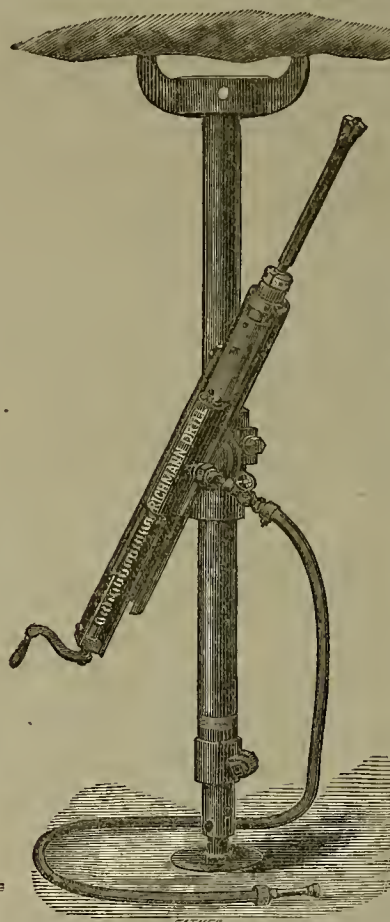
THE YOSEMITE.—J. M. Hutchings, the guardian of the Yosemite and Mariposa Big Tree parks, passed through Stockton recently, en route to San Francisco, whither he is called by the burning of his home. Mr. Hutchings states that the valley was dreadfully neglected by the old commissioners; in fact, everything seemed to have been done to keep tourists away from it—the grandest of Nature's wonders. He recently set men to work clearing the river from the timber which had fallen into it, and had made sufficient from the sale of the same for firewood to pay the cost of clearing. Mr. Hutchings believes that much can be done to make the place more attractive to tourists. There are a number of improvements which can be made. For instance all the roads to the valley should be thrown open without toll, so that a visitor should not have to pay a cent for this class of expenditure the moment he gets within the grounds. To carry this out, it will of course be necessary to buy out the owners of the present toll roads, but this would be a paying investment, as inviting travel to this State. Footpaths should now be made between the different hotels, to afford visitors the opportunity of passage.

REMOVING SCALE FROM WIRE.—Dr. Hermann Wedding speaks emphatically on the importance of adopting mechanical means for removing the scale from the wire after it has been annealed. In a Westphalian establishment the Altpeter scouring system was introduced in order to supersede partly the removal of scale by pickling. Formerly 18.5 parts of sulphuric acid was used in pickling wire rods and 6½ parts for wire drawn, for every 1,000 parts of finished wire. After the introduction of the new process, the consumption of acid decreased to 2 parts per 1,000 parts of wire.

MIXED FIBERS.—Manufacturers know that vegetable fibers mixed with woolen fibers cannot be equally spun, dyed, etc., together, because vegetable fibers are straight, whereas animal fibers are spiral in form. Herr Neumann, an Austrian scientific man, claims, however, to have discovered a chemical process by which such a combination of varying fibers may be rendered amenable to the operations mentioned.



RICHMANN ROCK DRILL ON TRIPOD.



RICHMANN ROCK DRILL ON COLUMN.

The method by which the drill-tool is secured to the drill-head or piston-rod is peculiar, and is such that it is gripped securely, not at one point alone, but for all its length inside the drill-head. To accomplish this the drill-head, which is attached to, or forms part of the piston-rod, has a tapering bore formed in the end, and its outer end has right-hand threads upon it.

The Drill-Clamp.

The drill-clamp is made in two or more pieces, and is tapered to correspond with the tapering hole in the end of the drill-head. A slot is formed in the tapering portion, into which a small screw projects, this screw passing through the drill-head and setting in flush. The slot is extended or elongated to allow of the clamp being moved inward or outward for a certain distance; but the screw prevents the clamp coming out altogether. The outer end of the clamp has left-hand threads formed upon it inside of the shoulder.

To cause the clamp to grip the drill, a sleeve is employed, the inner portion of which is threaded, half right and half left with threads of different pitch. That portion nearest the drill-head is threaded to take the right-hand threads of the drill-head, and that portion nearest the drill is threaded to take the left-hand threads of the clamp, which are of different pitch from the threads of the drill-head end. To insert the drill in the clamp the clamp proper is slightly screwed out by turning the sleeve, and opens enough to allow the drill-hut to enter, and is then screwed back. To cause the clamp to grip the drill tightly the sleeve is screwed in, thus drawing farther into the beveled hole in the drill-head the beveled clamp carrying the drill-tool. As the clamp comes in the beveled sides squeeze the clamp more tightly, and

as on the forward stroke, since the presence of the piston-rod at the front end reduces the effective area of the piston at that end. Drills sometimes, therefore, stick or move slowly in being moved back, a defect which Mr. Richmann remedies by making the front end of the piston larger than the rear. The increased diameter of the front end is sufficient to account for the loss from the diameter of the rod, and the opposite ends of the piston are, therefore, of the same effective area. He has, consequently, the same piston-area at both ends, and the piston is given the same power in drawing back as in going ahead.

The cylinder has attached to it on one side an air chest in which the valve moves, this little valve controlling the admission and emission ports. The arrangement of the ports, in combination with this, is most ingenious, and it is really in this that the drill excels. The valve and piston move in the same direction, and the admission and exit of air is, therefore, regular, the jar communicating to the parts not affecting it.

The valve and piston are both perfectly cushioned. One of these drills has been run 1,500 blows a minute for a week at a time, in the shop, striking at air alone, which is a most severe test, yet pieces of paper, placed on the inner sides of the cylinder-heads, showed no signs of being touched. No packing, springs, or rubber are used to lessen the jar, a perfect air cushion being formed at both ends. It can, therefore, be run at great speed without the possibility of striking or injuring the heads. Thus speed can be maintained at any pressure. The valve motion though simple in operation, is very difficult to understand from a mere written description. It is all accomplished by the peculiar arrange-

Manufacturing and Other Industries of the United States.

The manufacturing industries of this country are carried on by the direct labor of about 3,000,000 of prosperous working people employed in about 300,000 separate mills, shops and manufacturing establishments. To keep this great army of workmen employed requires an investment of \$2,500,000,000, and the direct annual payment to employees of \$1,000,000,000. The raw material involved is valued at \$3,000,000,000, while the value of manufactured products annually turned out is estimated at \$5,000,000,000. To accomplish all of this, 50,000 steam engines, as many water wheels, and 3,000,000 of horses are required.

Cotton Manufacture.

In tracing the progress of our various manufacturing industries, we go back less than 90 years to reach the first cotton mill, and a very small one too, which was started at Pawtucket, Rhode Island, by Samuel A. Slater, just before the breaking out of the war of the Revolution. From that small beginning, the business has steadily grown from year to year until \$1,500,000,000 pounds of cotton are required to supply the many thousands of mills planted all over New England, and more or less frequently met with in nearly every State in the Union. The present annual value of the cotton manufactures of this country is estimated in round numbers, at \$500,000,000. The products of our looms are found in almost every land on the globe, not excepting England, herself; where, even in the city of Manchester, itself, the Wamsutta mills, of New Bedford, have long had an active and profitable agency for the sale of their goods. Our exports of cotton goods are now rapidly on the increase. We exported in 1874, cotton goods to the value of \$3,095,840. Since that time the advance has been as follows: In 1875, \$4,071,832; in 1876, \$7,722,278; in 1877, \$10,235,843; in 1878, \$11,438,660. From this it will be seen that the export of cotton goods was more than trebled during the five years enumerated. It is true, that the year previous to the war we made a most exceptionally large exportation. But that branch of trade was nearly ruined during the years of our internecine strife, and is only just now beginning to reassert itself. Its future growth can scarcely be calculated.

Woolen Manufacture.

The first rude woolen mill in this country was established at Newbury, Mass., in 1794. Since that time our woolen manufactures have grown in extent and excellence until that business now employs a working capital of \$300,000,000, and numbers over 1,200 sets of machinery kept in motion by over 200,000 operatives, as well skilled as can be found in any part of the world. The annual output of goods is valued at fully \$208,000,000, which in point of cheapness and excellence, successfully competes with the best products of Europe.

Our Silk Industry.

The manufacture of silk, after struggling with difficulties of almost every conceivable character for nearly half a century, has recently secured a permanent foothold, and entered upon a period of prosperity as marvelous as it is encouraging. Among the most successful parties are the Cheneys, of Connecticut; but the steady persistence of the silk manufacturers of Patterson, N. J., has finally resulted in an almost marvelous degree of success. The silk manufactures in that place now number 250, with a production of goods to the annual value of \$30,000,000, which in strength, durability and finish are equal to the finest products of Lyons. In regard to the silk industry in the United States an English exchange says: "For many years the shrewdest merchants in the States scouted the idea that silk goods could be made in this country to compete with France. But the Americans are apparently in a fair way not only to dispense with manufactured silks from France, but also with the raw material from China and Japan."

Iron and Steel.

In the manufacture of iron and steel our progress has been even more marvelous than in that of textiles. The United States consumes more iron than any other nation, or one-fifth of all that is consumed on the globe. The quantity of iron and steel required to keep up and extend over 90,000 miles of railroad is simply enormous. Over 312,000 tons of pig iron are annually required for the construction of the single article of new wheels, on which our cars and locomotives run. Passing from railroads to bridges, houses, ship-building, fencing, etc., etc., the total demand for iron and steel reaches fully up to the vast annual total of 4,000,000 tons. The growth of our Bessemer steel product is equally as marvelous as the same product has been in Great Britain. Twenty years ago this wonderful illustration of the value of chemical science was looked upon as merely an interesting and curious process of extremely doubtful promise. But the Bessemer works of Great Britain alone, with 120 converters are now turning out about 800,000 tons of steel a year; while the United States, with not more than half as many converters, but superior in character and management, will produce over 200,000

with 500,000; then follows France with 300,000; Austria, 250,000; Belgium, 150,000; and Sweden and Russia together, 150,000. Stupendous as these figures appear, the demand for iron is everywhere increasing in an accelerated ratio.

Our Wheat Product.

The wheat-growing interest of this country embraces areas so vast that the work of gathering accurate statistics in regard to the annual yield is far more difficult than is the same work in the more narrow and densely populated countries of Europe. The returns for the present year are set down by different authorities at from 465,000,000 to 485,000,000 bushels. Taking the smaller estimate, 43,000,000 are credited to the Southern States, and 41,000,000 to the Pacific States, of which last amount, California has produced about 37,000,000—about 2,000,000 in excess of last year. The coast will have about 31,000,000 of this year's crop for export, to say nothing of the surplus which has been kept over from last year. The needs of the entire Union for food, seed, etc., is set down at about 295,000,000, which will leave a grand surplus of 200,000,000 for export. From the best information attainable, this surplus seems to be about 25,000,000 bushels in excess of the prospective demand. A small decrease in the price would, no doubt, largely increase the foreign demand; but the surplus is not sufficiently large or certain to justify any special fears that prices will be materially lower than those which now prevail.

Agricultural Machinery, etc.

No better idea can be formed of the rapid increase of our agricultural industries than by a reference to the increased demand for agricultural machinery. In 1850 the production of agricultural implements in this country gave employment to 5,351 hands; in 1860, to 12,867, and in 1870, to 23,251; by the census of 1880, which is now being tabulated, the present number of hands engaged in this industry is 40,680. This exhibit shows a doubling up of this industry every 10 years.

American agricultural machinery and American farm implements are beginning to be regarded with much interest in most foreign countries. An American mowing machine recently took the first prize in a trial on the distant fields of Belgium. Notwithstanding English prejudice, our farm implements and machinery are being very favorably received both in England and in her colonies. They are lighter and at the same time, generally stronger; the latter largely for the reason that they are made of better iron and better wood. An extensive English manufacturer recently sent his foreman to visit some of the leading workshops of the United States. He came and saw, and returned to his own country with much more respect for what his countrymen had called "Yankee brag" than is generally held by British workmen. The foreman conceded that nearly all which had been claimed for American machinery was literally true.

English Conservatism.

The great drawback with English mechanics is their dislike to innovations. They are inclined to stick to old processes and methods. They refuse to acknowledge that a machine can be made to do more perfect work than human hands. Hence they fail to compete more successfully with the more progressive Americans in the manufacture of sewing machines, of certain classes of fire-arms, watches etc. An English mechanic, who recently visited some of our work-shops, writes his impression to the *Sheffield Telegraph* as follows: "The use of files, rasps, and floats are superseded by other tools, (machine tools,) astonishing in their adaptability for perfect and rapid production. No written description could convey an idea of their great ability and method. The skill of the engineer has taken the place of the skilled artisans; for mere boys are tending these operations, and yet quality is not ignored. The readiness of the employers to adopt any practical suggestion from any one of their hands is a notable feature in most American factories, whereas the cold shoulder is generally given such in England. We weakly waddle in the wake of America in the matter of inventions until a necessity is proved, when an earnest effort is made and progress is attained. Old-fashioned methods of manufacture will have to be abandoned for newer and better ones, if *'Mene, mene, tekel, upharisin,'* is not to be written across British commerce in the future. The individual skill and handicraft of the best Sheffield workmen I have not seen surpassed in the United States, but they are inadequate for all the requirements of the present age."

American Competition Abroad.

All over the world attention is being drawn to American manufacturing goods, which are, if slowly, yet surely forcing their way into, and successfully competing in all foreign markets, with European manufactures. Our cotton goods, both heavy and fine, and spool-thread, are rapidly taking the place of English. Our printing and wrapping paper is finding a ready sale in the East and West Indies, and South America; while even bank note and bond paper is in demand in Rome, Italy, Austria and Spain. American cutlery is sold in Birmingham; our locks are supplanting those of English make in English dwellings and warehouses; American underwear finds a ready market in France, England and Germany; American jewelry is exposed for sale in the shops of Paris, and if we are not sending coal to New Castle, London is certainly talking of supplying her grates and furnaces with Anthracite from

American palace cars are now to be seen on English railways and American locomotives on various European roads. American street cars are threading the streets of London and Paris, while American elevators are being put into Paris hotels. We are finding a foreign market almost everywhere for machinery, chemicals, fire-arms, musical instruments, tobacco, axes, and edge tools of almost every description, shovels, cut nails, plated ware, "Yankee notions" and hundreds of other articles that need not be enumerated.

American Joinery Work.

The abundance and cheapness of our superior woods, and the superiority of our labor-saving machinery over British hand-made work has enabled our mechanics to export largely such articles as doors, sashes, blinds and inside finish work for dwellings to both England and her colonies. The manufacture of such joinery, by factory work, is distinctly an American industry, and has never been introduced to any extent into Europe. The first shipping of such articles was commenced only within four or five years; but it is already growing into an extensive and profitable business. The first large shipment to England was made in 1877, and consisted of 19,000 doors and 6,284 pieces of blinds. A large portion of this shipment subsequently found its way to Australia. No less than 45,000 doors were shipped from New York to England in 1878, and the trade is constantly increasing, and will continue to increase for the reason that English workmen will not use machinery, and lumber must be obtained either from Norway or America. During a single month of 1879 over 32,000 doors were shipped to foreign countries from San Francisco and New York. California comes in for a great share of this growing business. Her position is such that she need fear no competition in the supply of Pacific ports and islands. Australia is her most important customer for machine-made joinery and lumber, and there is no reason why this trade may not continue to increase indefinitely.

American Watches in England.

Have almost entirely superseded the English article, and to-day all the great lines of English railroads, both in England and India, supply their superintendents, conductors and guards with American watches in preference to any others. A writer in the *English Mechanic* says that there are over 300,000 American watches now in use in Great Britain, and advises manufacturers and the trade to "cease their futile disparagements of American watches, every one of which is a standard refutation in itself, and go to work and beat them if they can." Within the last few months, most of the leading English mechanical journals were engaged in an exhaustive discussion in regard to the relative merits of the American machine-made and the English hand-made watches. The result of the argument appears to sustain the practical view of the question taken by the English railroad managers. During the discussion, Sir Edmund Beckett, president of the British Horological Institute, said: "There can be no doubt in the mind of any one who understands machinery, that the American is the best as well as the cheapest way of making watches that require precision and uniformity." Mons. Jopy, a French manufacturer who employs some 8,000 hands in watch and clock making, in a recent address declared our machine products more accurate than the products of hand work.

New Discovery.

Ed. Greeley, one of the original owners of the Prospectus mine, has made a new and very important discovery about one mile in a southerly direction from this place, and near Table mountain. For many years it has been the opinion of prospectors that a mammoth ledge existed in the neighborhood of the new find, as rich float rock in abundance has been found there and on Table mountain, but no croppings were discovered, and the hunt, until a few days ago, failed to develop anything. The ledge found by Greeley is a blind ledge, and was struck within a few feet of the surface. It is on a direct line with the Prospectus, and the ore is exactly the same. This find demonstrates to a certainty that an immense true fissure vein courses from Humoldt hill to Table mountain, and by sinking deep enough anywhere between these two points the ledge can be struck. It also proves the theory entertained by many that all the float found on Table mountain came from Middle Silver and Last Chance hills in correct, though there is little doubt but that some of it did come from these points, as the character of the rock indicates. The project of running a tunnel from Del Monte mill to tap Last Chance, Middle or Silver hill, advanced by the *Herald* last spring, would, without doubt, develop bodies of ore that in richness and immensity have never been equaled anywhere in the known world. Here is a chance for capitalists to invest a few hundred thousand dollars that would return them a sum of money in comparison to which the significant fortune of the Rothschilds would sink into insignificance. —*Esmeralda Herald.*

The mining property situated near Hornitas, in Mariposa county, formerly known as the Number Nine mine, and more recently called the Yosemite, has been sold to Marcus and J. W. Hulings, of Oil City, Pa., for \$77,000. This quartz-church mill, besides many other valuable improvements recently built and com-

The Big Horn Country.

"The Big Horn country" is an expression used by miners to designate all the country drained by the southern tributaries of the Yellowstone river, west of Powder river. It includes the Wolf, Big Horn, Clark's Fork and Wind River mountains, or all the ranges and valleys north and west of the Black Hills of Dakota and between them and the old mining camp of Montana Territory and of northeastern Idaho Territory—taking a large extent of southeastern Montana and northern Wyoming. In its topographical features it is one of the most interesting sections of the continent, and the eye of the prospector has been turned toward it since the first discovery of gold on the headwaters of the Missouri.

From 1869 to 1875 attempts were frequently made by prospecting parties organized in Montana and Idaho, to explore these regions, but, owing to the hostility of the Indian tribes, about all their time was occupied in protecting themselves, and little prospecting was done by them. The reports made by these exploring parties have all been conflicting—some maintaining that the "Big Horn country" would develop into another California; others completely discouraged by their rough experience declaring that no paying gold mines exist in the Big Horn mountains. The total failure to find paying gold deposits of a strong prospecting expedition which left Deadwood in 1876, and crossed the Big Horn mountains to the Yellowstone river, near where Fort Keogh is located, was the most discouraging blow ever given to prospecting in the Big Horn country; but, considering that this Black Hills party was almost entirely composed of newly arrived emigrants from the Eastern States, who were ignorant of practical gold mining, and that the leaders were Montana miners only anxious to return to their old diggings in safety, it was a reasonable foregone conclusion that it would not find anything. But an important point in all the reports of prospecting along the upper southern tributaries of the Yellowstone is this—all agree that encouraging indications were found—"colors" have generally been found in the gravel panned out, and encouraging prospects obtained from the float quartz picked up. Taking this important point as the basis of speculation, and taking into consideration the vast extent of the Big Horn country, and the fact that in all the great mining regions the sections of actual productiveness are of insignificant extent as compared with the entire area of mineral indications, it may be reasonably concluded that the Big Horn country is a prospective mining field of great promise. Rich silver ores exist in places on the head of the Clark's Fork, and gold veins have been found in the Wind river—which is in fact the upper Big Horn river—placer deposits are being and for years have been worked on the upper Yellowstone, about 25 miles above the old Crow Agency, and placer prospects have been found on the Crazy Woman's Fork, three-fourths the way across from the Yellowstone river to the Black Hills camps. These actual developments, so far apart, and representing all sections of the Big Horn country, seem to show that the Black Hills are but the eastern extension of auriferous and argentiferous regions which extend several hundred miles to the northward and westward. If this view is correct it gives us a vastly enlarged idea of the extent and promise of our American gold and silver mining industries. Sitting Bull, his forces decimated to a little starving band who are supplicants for mercy on any terms the government chooses to impose, will no longer terrorize those regions and we have an assurance that they will be entered and crossed by two if not three railroad lines within the next three years—the Northern Pacific by way of Bismarck, and the Chicago and Northwestern by way of the Black Hills, and possibly a branch from the Union Pacific, by the National Park.

TO PROTECT GOVERNMENT TIMBER.—Our Red Bluff correspondent recently gave us a vigorous letter on the evil of firing the timber on the untaken lands of that county. We notice that Secretary Schurz brings up the subject of protection to Government timber in his annual report to the President. He outlines the following legislation as necessary: "First, that the Government should be authorized to sell timber from the lands principally valuable for the timber growing on them; that is to say, not suited to agricultural or mineral purposes, at a reasonable price above the nominal rates, to supply all domestic needs and all wants of local business enterprises, as well as for commerce; the latter so far as compatible with the public interests. Secondly, that these sales of timber be so regulated as to reserve the necessary proportion of the forests on public lands from waste and indiscriminate destruction. Such a policy can, in his opinion, be carried out without great cost, and in perfect justice to the settlers and business enterprises of the country. It is virtually the policy proposed by the Public Lands Commission in their report, and the bill submitted to Congress at its last session. He again urges the enactment of a law, prescribing severe penalties for the wilful negligence or carelessness, setting of fires on public lands, and providing for the recovery of damages sustained. *Rural Press.*

THE concentrating works at the Great Basin mine, Stockton, have started up. Water is conveyed to the works through five miles of

Gold and Silver Refining.

There have been and still are a number of different processes by which gold and silver are refined. The one which was formerly in most general use was the nitric acid process.

After the proper portion of gold and silver are inquarted and granulated, the granulations are treated with nitric acid, the acid dissolving the silver and forming nitrate of silver, the gold settling to the bottom of the pots. The solution, after being drawn off, is treated with sodium chloride (common salt dissolved in water), the silver being precipitated as the chloride of silver. The precipitate is then washed till it is "sweet," and reduced with iron or zinc to metallic silver. It is then refined by fluxing.

This process was used in the United States Assay Office till the year 1866, when Mr. Andrew Mason, the melter and refiner, introduced the present system or process. A complete description of this process of refining as carried on at the assay office in New York city was written by Edward E. Sage, C. E., and published in the "School of Mines Quarterly" of Columbia College, for November. Mr. Sage says:

This process consists of seven different operations.

(1.) Inquartation and Granulation of the Bullion.

The gold and silver are sent from all parts of the country, consisting of bullion, amalgams, plate, etc. These are melted and assayed, and are then turned over to the melter and refiner. The bullion is again melted in a large graphite crucible; the charge being made up so that the gold and copper shall not exceed one-third and one-twelfth parts of the entire weight of the metal. When the metal is melted and thoroughly mixed, it is granulated by pouring it into a cylindrical iron tank, three ft. high by three ft. in diameter, filled with cold water. A peculiar rotary motion is given to the metal as it is being poured.

The tank is supplied with a copper colander, which, when the charge is all granulated, is raised by means of an iron crane, the water nearly all running off. It is then poured on an inclined iron table to allow the rest of the water to drain off.

(2.) Solution of the Granulations.

The pots used for the parting of the alloy are made of case iron, three ft. and a half and two ft. in diameter, by three ft. and two ft. in depth, and are set on brick fireplaces.

There are four pots holding 160 gallons, and three, holding 50 gallons. Each pot is covered with a funnel-shaped hood of sheet lead, with an opening 30 inches long, through which the charge is introduced, and which has a sliding door. From each of these hoods a lead line to the condensing chambers, which are two in number, on the floor above; from the last of these a long winding leaden line leads into the stack. Both chambers have platforms, on which coke is laid several ft. in thickness; through this the fumes pass, and are condensed. These chambers are supplied with water sprinklers, so that a spray of water is continually cooling the atmosphere in the chambers. Nitrous fumes are furnished by nitrate of soda, acted upon by the sulphuric acid.

About 300 lbs. of the granulations are put in each of the larger pots, with about 650 lbs. of sulphuric acid, and 250 lbs. more of the acid is gradually added during three hours' boiling. The resulting solution is then run off by means of a siphon into the receiving vats on the floor below.

The fire being withdrawn, a partial charge of acid is added, and the gold residue is then taken out by means of a perforated iron ladle, and placed in two of the smaller pots. In these it is boiled for six hours, with three successive charges of about 300 lbs. of acid. It is then placed in the third pot and boiled twice. The acid from the last five boilings is poured or run off into reservoirs on the floor, and is used again as a portion for fresh granulations.

The gold is then placed in a washing-tub, where it is washed once with cold and twice with warm water; this water is poured into the washing-tub, from which, on settling, the solution is run into a large tank on the floor below.

(3.) Treatment of the Gold Residue.

The gold is now emptied into one of the filters, washed thoroughly with warm water till it becomes "sweet," and then drained. It is then boiled in two charges of acid for four hours, and again washed and sweetened. (When it is desired to make very fine metal this process is repeated.) It is then thoroughly drained and pressed into cakes by a hydraulic press.

(4.) Melting and Refining the Gold.

After the gold residue is pressed into cakes, these are placed in an oven and dried. They are then taken to the melting room, where they are broken up and placed in a graphite crucible, fluxed from three to five hours, and run into bars, varying from 997½ to 998½ thousandths in fineness.

(5.) Treatment of the Silver—The Reduction of the Silver.

There are for this operation four reducing vats, two concentrating vats, eight crystallizing

vats, and three filters, two ft. nine inches in diameter by 19 inches deep, with a space below. Two tanks on a high platform receive the washings from this gold.

The size of the reducing, concentrating, and crystallizing vats varies, on account of having to accommodate them to a given space.

The vats and tanks are made of wood and lined with heavy sheet lead. The reducing and concentrating vats are heated by a system of coils of lead pipe, through which steam passes. These vats are enclosed, and connected by a flue with the stack.

Before the sulphate of silver is run into the vats, ingots or bars of copper are placed on end around the sides and bottoms, next to the heating coils. The solution is then run in. A sufficient amount of water, together with the weak solution obtained in washing the gold, is added, to reduce the strength of the solution to 15° to 25° Baume., which has been found to facilitate the reduction. The sulphuric acid leaving the silver to attack the copper, the silver is precipitated or deposited as metallic silver. It requires from five to six hours boiling to complete the reduction.

The resulting copper solution is run off through a filter into a concentrating vat. The silver remaining on the copper bars is scraped off, and the whole is put in a filter. Copper hoes and shovels are used in the handling of the silver. About two hours' washing with warm water is required to "sweeten" the silver. It is then drained in the draining boxes, pressed into cakes by the hydraulic press, and dried in an oven similar to that used for the gold.

When silver containing little or no gold is operated upon, 350 lbs. of granulations are dissolved in one pot. With baser metals, the charge of granulations is reduced; copper requiring much more acid to dissolve it than silver.

(6.) Melting and Refining the Silver.

The cakes are broken up and placed in graphite crucibles, and fluxed with nitrate of soda, borax, bone ash, and a little soda ash. These re-agents absorb the little base metal which remains, as the sulphate, in washing. From four to six hours are required for fluxing. The silver is then cast into bars of 998½ to 999½ thousandths fine.

(7.) Treatment of the Sulphate of Copper.

The solution of copper being run into the concentrating vats, is boiled until it reaches the strength of 40° Baume. It is then run into the crystallizing vats. In several days the crystals are formed and the mother liquor is run off into the large tank on the floor below, from whence it is run into the carboys or tanks of its purchasers.

The crystals of sulphate of copper are taken from the sides and bottom of the vats and drained. They are then dissolved in water and run back into the crystallizing vats at a strength of 32° to 34° Baume. The sulphate of copper again crystallizes, and the mother liquor is put back into the concentrating vats. The crystals are then taken from the vats, dried, put into barrels and sold.

If lead is present to any extent in the bullion, it is removed by cupellation before it is granulated.

The consumption of copper is greatly economized in the reduction of silver by melting silver deposits free from gold and under, say, 400 fine with the copper used for that purpose. The silver in them is thus obtained pure without a direct parting, the copper alloy taking the place of that amount of the purchased metal that would otherwise be used.

The form and size of much of the apparatus used, were determined not only by the size of the space that could be utilized, but by the necessity of harmonizing the introduction of each stage of the sulphuric with the nitric acid process, until it was clearly seen by actual experiment that the former was rational as well as superior to the latter.

The proceeds of the sale of the sulphate of copper crystals and the liquor, nearly cover the total expense of the acid and bar copper bought.

All the wood used, after it becomes useless, is burnt. The old, unserviceable crucibles are broken up and ground. (The grains obtained from them are melted and treated as before.) It is then put through a rough washing and amalgamation process, the resulting tailings being dried, assayed, barreled and sold to sweep smelters.

TESTING FOR ACID IN OILS.—The oil is mixed with two or three times its volume of ether, or, if it is a solid grease, dissolved entirely in this liquid. A drop of alcoholic solution of rosolic acid is then added, and the solution tested with a standard solution of caustic potash, the liquid being kept in movement during the whole time. The slightest excess of alkali produces the well known magnificent red color which indicates the termination of the test.—*Geissler*.

PRIZE FOR SCIENTIFIC RESEARCH.—The Vienna Academy of Science proposes as the subject for the Baumgartner prize of 1,000 florins, the microscopic investigation of the wood of living and fossil plants, in order to ascertain whether it is possible to determine with certainty from the examination of the microscopic sections what the genus and species of the plant may have been from which they were taken.

The Beginning of Rail Manufacture in the United States.

The great railway interest has assumed such vast proportions in the United States—where, according to Poor's last volume, there are 41% of the railways of the world—that every incident in its growth and progress possesses general interest. There was, not long since, printed in the *New York World*, an account of the beginning of the manufacture of rails in this country, of which we present a summary:

The first T-rail laid on a railroad in the United States was imported from England by the Erie Railway Co.—then the New York and Erie—in 1845, and the first rail of that kind ever made in this country was manufactured for that company in 1846 by the Lackawanna Iron Works of Harrison, Pa., now the city of Scranton. The recent resignation of W. W. Scranton from the general management of the Lackawanna Coal and Iron Co., which is the Lackawanna Iron Works of 1846, recalls a series of incidents in the early history of the Erie road and of the iron works by which the pioneer of trunk roads in America was saved from bankruptcy and the forfeiture of its franchises to the State of New York, and the struggling iron manufacturer was enabled to raise itself from insignificant proportions and impending ruin to be the most wealthy and powerful corporation of its kind in the country.

Work was begun on the New York and Erie railway in 1835, but the financial revulsion of 1837 forced the suspension of operations. In 1838 the State of New York aided the company by its credit to the amount of \$3,000,000. This sum was expended, and only 61 miles of the road were completed up to 1845. The original idea of the engineers was that the rails must be laid on piles to have a solid and even foundation; and for 90 miles westward from Owego two miles of posts were actually sunk. This ridiculous proceeding not only absorbed a large part of the company's funds, but wasted valuable time. The State was anxious to have the important work of connecting the great lakes with the ocean by a line of rails completed, and again came to the aid of the company. An act was passed by which the company was relieved of the claim of the State for the loan of \$3,000,000, and such substantial aid was extended that the company was enabled to resume the construction of its road with a well-filled treasury. By the act the company had four years in which to complete 137 miles of road between Piermont and Binghamton; otherwise it should be forfeited to the State.

In 1843 Geo. W. and Selden T. Scranton established a nail factory and rolling mill at the small village of Harrison, Pa., a part of the Lackawanna valley then almost entirely undeveloped. The Delaware and Hudson Canal Co. had opened coal mines in the upper part of the valley, and had founded several villages. Their now-famous gravity railroad—the first railroad for actual transportation in the United States—extended from Archibald, nine miles north of Harrison, to Honesdale, the head of the company's canal. The works of the Scranton Bros., sustained by meager capital and opposed by local prejudice, struggled along for three years, and bankruptcy seemed inevitable. In 1846, however, they determined to either assure the future by a bold stroke or go down in the effort. They knew that the Erie Railway Co. was obliged to pay \$80 per ton for English rails, and that in the face of its straitened circumstances and the limit imposed by the State for finishing the road to Binghamton, it must obtain rails at cheaper rates and more speedily than the foreign article could be furnished. The Scrantons boldly resolved to venture on the manufacture of rails at their works. They suggested the idea to a number of capitalists who were deeply interested in the Erie road, and these gentlemen agreed to advance to them \$100,000, in order to enable them to buy the necessary machinery, with no security but their word of honor. A contract was made by which the Lackawanna Iron Works agreed to furnish the Erie Co. with 12,000 tons of rails at a rate much less than the English iron cost to be delivered at Lackawanna, Pike county, Pa., during the years 1847-8. It required several months to fit the works with the furnaces and machinery, which were hauled by teams more than 60 miles over the most primitive of mountain roads.

The first rails were turned out by the Brothers Scranton in the latter part of 1846. As fast as the iron was ready it was sent in wagons to Archibald, where it was loaded on the cars of the Delaware and Hudson's gravity road. By these it was carried to Honesdale over the Moosic mountains and transferred to canal boats, which delivered it to the company at Lackawanna. The first 1,500 tons were taken to Port Jervis, N. Y., by canal, and the track between that place and Otisville, the western terminus was laid. Everything worked smoothly until it was attempted to carry the road across the Delaware from Port Jervis into Pike county, Pa., where serious trouble arose.

It was the original intention that the line should cross into Pennsylvania at Matamoras, nearly opposite Port Jervis, but the route was found to be impracticable. The Erie company, therefore, fixed on a point for crossing the river three miles above Matamoras, but it was met by an injunction from the Milford and Matamoras Co., which had been chartered by Penn-

sylvania. The work on the Erie road was stopped, and this delay threatened to prove fatal to the completion of the line to Binghamton in the stipulated time. Finally the difficulty was compromised. The unfortunate delay in the work made it necessary for the iron company to distribute the rails at the different points along this route. Roads had to be cut through dense forests. Over 400 mules and horses were required, as many as 10 span frequently being attached to one wagon. The rails were simultaneously laid east and west from the points named, and only five days before the stipulated time for the completion of the road to Binghamton had expired, the last spike was driven. At the celebration of the event in 1848, President Benjamin Loder declared that the energy and enterprise of the Brothers Scranton had saved the New York and Erie railway to the company.

The contract was a profitable one to the iron works. It laid the foundation for the city of Scranton. It led to the building of the Delaware, Lackawanna and Western railroad and to the Pennsylvania Coal Co.'s railroad in the Lackawanna valley and to the great coal development that followed. It brought more than \$250,000,000 capital into the valley, and made of the tottering Lackawanna Iron Works the rich and powerful Lackawanna Coal and Iron Co., the iron and steel and mining industries of which to-day give employment to 3,000 men.

Lead Fumes.

Lead fume or smoke is formed, partly mechanically, when fine particles of ore at the moment of their transformation into carbonate and sulphate of lead come into contact with the hot gases during the charging of the furnaces, and during the roasting process. It is also formed by the volatilization of metallic lead during the second period. The fumes consist, usually of oxide, carbonate and a little sulphide of lead, with more or less silver, which is volatile at very high temperatures.

The formation of lead fumes is so considerable that they are collected in suitable condensation flues and chambers, and then re-worked. The following analyses, which we take from Crooke's & Rohrig's metallurgy, show the composition of different kinds of lead smoke.

	PbO	As	Fe ₂	Zn	PbO	Pb	Al ₂	Si
	SO ₃	O ₂	O ₃	CO ₂	S	O ₃	O ₃	O ₃
1	11.0	69.0	2.0	12.0	15.0	...	...	13.2
2	...	39.0	1.5	...	2.7	35.0	4.5	...
3	10.2	65.6	...	3.4	13.8	...	1.4	...
4	42.5	39.0	...	...	...	...	...	17.4
5	71.2	...	...	trace	...	...	...	7.2

In these analyses 1 was smoke from a roasting reverberatory furnace at Pontgibaud, the analysis being made by Berthier; No. 2 was the same, by Rivot; No. 3 the same of Alston Moor, by Berthier; No. 4 was fused lead smoke of Conlaux, by Berthier; No. 5 was oaked smoke from the chimney of the reverberatory furnace at Redruth, by Berthier. In addition, No. 2 contained 2.3% of ZnO SO₃; and No. 5 contained 0.2% of copper.

According to Rivot, the smoke of schlich smelting furnaces, at the Upper Hartz, contained the following sulphureted substances: 2.5% of C; 7.8% of S; 0.5% of As and Sb; 34.8% of Pb; 1.0% of Fe; and 1.0% of Zn. It also contained the following oxidized substances: 7.7% of CO₂ and O; 2.5% of As and Sb; 2.8% of SO₃; 2.9% of PbO, SiO₂; 18.0% of PbO; 1.5% of ZnO; 4.5% of Fe₂O₃; and 12.3% of SiO₂ and BaO, SO₃.

Kerl tells us that from the schlich smelting at Clausthal and Altenau, 7% or 8% of smoke, result; at Lautenthal, 10% or 11% and at Andreasberg, 0.8% to 1%. This smoke is smelted together with dressed scum containing 0.10 to 0.03 lb. of silver, and from 35% to 40% of lead, in schlich furnace, when combined in the following way:

At Clausthal, 36 cwts. of smoke, 9 cwts. of scum, 12 cwts. of roasted matte of the smoke smelting, 3 cwts. of iron, 5 cwts. of plumbiferous fluxes, 45 cwts. of schlich slag, and 6 cwts. of hard lead slag. At Altenau 54 cwts. of smoke, 18 cwts. of scum, 13 cwts. of roasted matte of the smoke smelting, 4 cwts. of iron, 3 cwts. of plumbiferous fluxes, 28 cwts. of schlich slag, and 20 cwts. of matte slag. At Lautenthal 30 cwts. of smoke, 6 cwts. of scum, 2 cwts. of iron, 6 cwts. of plumbiferous fluxes, 26 cwts. of schlich slag, and 20 cwts. of matte slags. At Andreasberg, 36 cwts. of smoke and scum, 2 cwts. of iron, 12 cwts. of plumbiferous products, and 73 cwts. of matte slags.

The consumption of coal at Clausthal amounts to 230 cubic ft.; at Altenau to 350 cubic ft.; at Lautenthal to 186 cubic ft.; and at Andreasberg to 250 cubic ft. The yield of raw lead at Clausthal is from 16 to 20 cwts.; at Altenau to 18 cwts.; and at Lautenthal to from 11 to 12 cwts.; and that of matte at Clausthal to from 16 to 19 cwts.; at Altenau from 18 to 19 cwts.; and at Lautenthal to from 12 to 13 cwts. Even after all this work, 11% of the lead fumes escape reduction by being again volatilized during the smelting.

In Deadwood district, Trinity county, on the Brown Bear mine, a number of men are at work grading the site for a mill. A 20-stamp mill with steam power will be erected,

Rainfall and Temperature in California.

The "climate of California" is a subject upon which all good citizens of the State consider themselves perfectly qualified to speak with

authority; and it seems a point of honor to speak of it always with praise. Yet if residents of different parts of the State enter into a discussion of details they never fail to disagree. It is the old story of the Knights of the

Shield. From different points of view different aspects are presented.

And this should impress us with the fact that the subject is not as well understood as it might be, and that there are widely varying

conditions at different points. Climate is "the condition of a place in relation to the various phenomena of the atmosphere, as temperature, moisture, etc., especially as they affect animal life or man." In view of this definition it is

	San Fran		Niles		Liverm'r		Stockton		Sacra'to		Auburn		Cisno		Truckee		Marysv'll		Modesto		Red Bluff		Fairfield		Merced		Petaluma		Tulare		S.Mateo	
DATE	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.	TEM.	RAIN.
1870-JULY					71.96		74.13				80.84		63.16		63.35	1.30																
" AUGUST					71.48		76.25				77.40		64.83		64.83																	
" SEPTEMBER					67.51		63.62				69.73		65.82		65.82																	
" OCTOBER					64.50		63.94			60.60	62.61		47.93	1.33																		
" NOVEMBER					56.11		55.73	0.8	61.30	58.79	89.25	3.11																				
" DECEMBER					49.10	1.06	46.70	92	42.40	38	46.60	46	24.00	4.38	20.40	68					1.25											
1871-JANUARY					2.00	50.00	1.42	46.90	1.23	40.20	2.42	47.20	7.21	31.60	7.11	24.60	4.80				1.60											
" FEBRUARY					47.21	32.90	2.15	49.20	1.41	45.70	1.34	45.40	2.41	28.20	3.03	28.30	50.10															
" MARCH					57.10	27	57.60	35	57.00	47	54.10	98	61.60	1.85	32.60	2.60	32.00	3.13	61.80													
" APRIL					54.00	82	59.30	1.25	60.10	53	67.90	1.05	65.80	3.67	30.70	3.25	39.20	2.00	67.20	53												
" MAY					53.00	20	63.20	13	64.60	24	63.10	1.66	61.00	2.00	44.80	2.50	44.20	28	66.00	1.00	61.60	0.9										
" JUNE					63.00		75.90		74.40		71.40		74.60				56.00		77.90		70.90	0.4										
Total.....		12.60		7.45		6.15		4.90		8.45		17.50		32.90		17.00		6.65		2.25												
1871-JULY					62.00		79.00		73.50		71.20		77.90		73.10		82.00		70.60													
" AUGUST					64.80		77.90		74.70		75.80		79.20		67.00		83.00															
" SEPTEMBER					77.30		80.20		70.70		66.80		77.40		63.40		74.50		76.10													
" OCTOBER					65.50	0.6	62.30	0.5	68.40		63.50	2.9	64.40	51	61.50	0.4	66.00	0.9	55.73													
" NOVEMBER					62.00	2.47	64.20	1.56	63.70	1.13	62.53	1.33	49.70	1.24	50.95	2.80	34.92	4.99	64.00	72	49.10	57										
" DECEMBER					53.00	11.64	61.60	11.91	49.60	11.69	49.20	10.37	47.30	10.37	47.30	10.37	47.30	10.37	47.30	10.37	47.30	10.37										
1872-JANUARY					56.00	2.15	62.90	2.15	49.20	1.41	45.70	1.34	45.40	2.41	28.20	3.03	28.30	50.10														
" FEBRUARY					64.20	5.92	61.70	4.32	54.50	2.60	64.10	3.41	61.20	4.34	48.00	9.35	30.30	13.53	25.10	10.49	51.97	3.88	47.10	2.20	49.40	1.63						
" MARCH					53.70	1.65	54.20	1.30	52.30	70	56.60	1.35	53.80	1.74	51.40	3.50	30.60	4.29	25.30	3.03	54.50	2.30	54.20	38	56.00	1.21						
" APRIL					56.30	1.14	54.90	94	54.70	63	57.30	63	57.60	61	51.80	2.00	30.60	6.93	25.70	4.11	55.40	1.03	53.20	73	57.70	1.73	68.40	1.09	60.80	39	57.40	
" MAY					56.30	01	61.10	61.90	67.70	10	67.00	23	63.50	63	43.70	1.13	37.60	60	69.90													
" JUNE					59.90	19	60.50	27	65.20	32	72.00	05	69.20	01	69.50	22	66.00		77.90		70.90											
Total.....		27.64		22.50		19.20		20.60		22.40		40.10		71.80		43.09		21.60		12.60		25.6		31.60		9.50		32.10				
1872-JULY					62.00		79.00		73.50		71.20		77.90		73.10		82.00		70.60													
" AUGUST					64.80		77.90		74.70		75.80		79.20		67.00		83.00															
" SEPTEMBER					77.30		80.20		70.70		66.80		77.40		63.40		74.50		76.10													
" OCTOBER					65.50	0.6	62.30	0.5	68.40		63.50	2.9	64.40	51	61.50	0.4	66.00	0.9	55.73													
" NOVEMBER					62.00	2.47	64.20	1.56	63.70	1.13	62.53	1.33	49.70	1.24	50.95	2.80	34.92	4.99	64.00	72	49.10	57										
" DECEMBER					53.00	11.64	61.60	11.91	49.60	11.69	49.20	10.37	47.30	10.37	47.30	10.37	47.30	10.37	47.30	10.37	47.30	10.37										
1873-JANUARY					56.00	2.15	62.90	2.15	49.20	1.41	45.70	1.34	45.40	2.41	28.20	3.03	28.30	50.10														
" FEBRUARY					64.20	5.92	61.70	4.32	54.50	2.60	64.10	3.41	61.20	4.34	48.00	9.35	30.30	13.53	25.10	10.49	51.97	3.88	47.10	2.20	49.40	1.63						
" MARCH					53.70	1.65	54.20	1.30	52.30	70	56.60	1.35	53.80	1.74	51.40	3.50	30.60	4.29	25.30	3.03	54.50	2.30	54.20	38	56.00	1.21						
" APRIL					56.30	1.14	54.90	94	54.70	63	57.30	63	57.60	61	51.80	2.00	30.60	6.93	25.70	4.11	55.40	1.03	53.20	73	57.70	1.73	68.40	1.09	60.80	39	57.40	
" MAY					56.30	01	61.10	61.90	67.70	10	67.00	23	63.50	63	43.70	1.13	37.60	60	69.90													
" JUNE					59.90	19	60.50	27	65.20	32	72.00	05	69.20	01	69.50	22	66.00		77.90		70.90											
Total.....		27.64		22.50		19.20		20.60		22.40		40.10		71.80		43.09		21.60		12.60		25.6		31.60		9.50		32.10				
1873-JULY					62.00		79.00		73.50		71.20		77.90		73.10		82.00		70.60													
" AUGUST					64.80		77.90		74.70		75.80		79.20		67.00		83.00															
" SEPTEMBER					77.30		80.20		70.70		66.80		77.40		63.40		74.50		76.10													
" OCTOBER					65.50	0.6	62.30	0.5	68.40																							

F CALIFORNIA.

points be about an equal distance from the ocean and also an equal distance from the Nevada desert. All the stations relatively to their surroundings are therefore similarly situated, and general laws have full operation, free from local disturbance. Commencing at the north end of the valley, the record is as follows:

Rainfall at North End of Valley of California.

Stations.	Latitude.	Longitude.	Height above ocean—feet.	Extent of series.	Annual mean of rain in inches.
Fort Reading.....	40° 30'	122° 05'	647	1852-56	29.11
Red Bluff.....	40° 10'	122° 15'	307	1872-77	18.41
Tehama.....	40°	122° 08'	222	1870-77	16.30
Chico.....	39° 40'	121° 50'	193	1871-77	21.99
Marysville.....	39° 21'	121° 30'	67	1871-77	17.46
Sacramento.....	38° 34'	121° 28'	30	1849-77	18.75
Stockton.....	37° 57'	121° 17'	23	1854-57	13.23
Modesto.....	37° 40'	120° 55'	91	1871-77	9.60
Merced.....	37° 20'	120° 26'	171	1871-77	9.36
Borden.....	36° 55'	120°	274	1875-77	3.32
Tulare.....	36° 14'	119° 18'	282	1875-77	4.83
Delano.....	35° 43'	119° 12'	313	1875-77	4.03
Sumner.....	35° 23'	118° 58'	415	1875-77	3.92

The proposition that the mountains should receive more rain than the valleys is also confirmed by the following exhibit, wherein have been selected successive stations on a line as nearly as possible east from San Francisco, thereby avoiding any increase of precipitation due to increase of latitude. The law, as stated by Guyot, deduced from experiment and observation, is that an elevation of 350 ft. is sufficient to diminish the mean temperature of a given place by 1° of Fahrenheit; that is to say, the effect is the same as if the place were situated 70 miles farther north.

Commencing near the center of the Sacramento valley, at the lowest elevation above the sea, the following results are shown:

Stations.	Latitude.	Longitude.	Height above the sea—feet.	Extent of series.	Annual mean of rain in inches.
Stockton.....	37° 57'	121° 17'	23	1854-57	13.23
Sacramento.....	38° 34'	121° 28'	30	1849-77	18.75
Rocklin.....	38° 45'	121° 12'	249	1870-77	17.30
Auburn.....	38° 52'	121° 02'	1363	1870-77	20.70
Colfax.....	39° 08'	120° 55'	2421	1870-77	42.72
Alta.....	39° 12'	120° 52'	3612	1870-77	47.32
Emigrant Gap.....	39° 18'	120° 35'	5220	1870-77	51.49
Cisco.....	39° 10'	120° 28'	5938	1870-77	55.32
Summit.....	39° 20'	120° 15'	7019	1870-77	58.48

That the least rain should be in the deserts, is confirmed by the records kept at various stations.

Commencing south and proceeding north, the following statement is shown:

Stations.	Latitude.	Longitude.	Height above the sea—feet.	Extent of series.	Annual mean of rain in inches.
Fort Yuma.....	32° 44'	114° 36'	200	1855-57	3.06
Fort Mohave.....	35° 06'	114° 35'	604	1859-66	9.65
Wadsworth.....	39° 42'	119° 15'	4077	1870-77	3.21
Hot Springs.....	39° 51'	119° 02'	4070	1870-77	3.90
Brown's.....	40° 00'	118° 35'	3925	1870-77	3.53

To exhibit the fact that the rainfall is more on the coast than in the Sacramento and San Joaquin valleys, in the same latitudes, a series of stations near the coast, south of this city, was located.

Stations.	Latitude.	Longitude.	Height above ocean—feet.	Extent of series.	Annual mean of rain in inches.
San Mateo.....	37° 34'	122° 18'	30	1873-77	15.74
San Jose.....	37° 20'	121° 52'	94	1873-77	10.24
Gilroy.....	37°	121° 31'	201	1873-77	16.45
Hollister.....	36° 50'	121° 23'	299	1873-77	9.66
Pajaro.....	36° 55'	121° 43'	31	1873-77	15.46
Salinas.....	36° 35'	121° 46'	52	1873-77	10.74
Monterey.....	36° 36'	121° 52'	42	1860-65	15.29
Soledad.....	36° 15'	121° 21'	188	1873-77	8.07

San Mateo and Modesto are nearly in the same latitude. Modesto has an annual mean of 9.60 inches of rain, while San Mateo has 15.74. San Jose and Merced are in the same latitude; the former has 10.24 inches, the latter 9.36 inches. As we go farther south the discrepancy between the coast and interior valleys is still more marked. Soledad and Tulare have the same latitude. Soledad gets a mean of 8.07 inches; Tulare, 4.83 inches.

The influence of the prevailing wind is very great. Coming south through the center of the Sacramento valley, from Redding on the north to Sumner on the extreme south, the mean temperatures of the various successive stations show the effect of the radiation of heat in this valley and the influence of the wind from the cool gulf stream where it flows through the Golden Gate and up the Sacramento river.

The following is the mean annual temperature of

Redding.....	61.14°	Modesto.....	63.68°
Red Bluff.....	60.22°	Merced.....	63.10°
Chico.....	62.40°	Borden.....	66.37°
Marysville.....	63.62°	Tulare.....	64.00°
Sacramento.....	60.48°	Delano.....	63.64°

Silver in Sandstone.

When, a few years ago, it was announced that silver had been found in sandstone formation, at Silver Reef, Utah, very few people believed that the find would amount to anything. Many so-called experts said it was nonsense to expect anything of the kind in such a formation, and, in fact it couldn't be possible. It was, geologically speaking, not only an improbability but an impossibility. It was found, however, practically speaking, not only to be a possibility, but a fact, and one very well evidenced on the "proof of the pudding" principle. That is, that in November the total bullion shipment of the camp was \$72,996, which is but a continuation of previous regular shipments. As early as May, 1875, a few men prospected in the camp, but left disgusted. Judge Barbee then came along, later in the year, went away, returned and prospected further. In December he shipped his first ore, and a little while after another shipment was made, for which he received \$7,000. He finally realized from ore, \$17,000 from Salt Lake smelter and \$23,000 from Pioche mills.

His district then began to attract attention, and in 1877 the Leeds mill was built; and also the Stormont and Pioneer mills. In 1878 the Christy, and Barbee & Walker mills were built. The camp is now a very prosperous one.

At a late meeting of the American Institute of Mining Engineers, Mr. Charles M. Rolker, of New York, read a paper describing this sandstone district in detail. From this paper, of which we have received advance sheets, subject to revision, we have taken the liberty of extracting such parts as are of general interest. In doing this, to accommodate it to our space, we have necessarily omitted a great deal of matter, but have endeavored to present the prominent features of the writer's description.

The remarkable district under consideration lies about 320 miles south of Salt Lake City, in Washington county, near the Arizona border. It is now reached by the Utah Southern railroad and its extension, and the last 100 miles are run by stages. Arriving at Silver Reef, the main camp of the district, one sees at once that he stands where once a surging sea had its domain, marked now by heavy sandstone deposits of a red and white color. The town itself, a neat, clean and orderly mining town, is encircled on the north by trachyte and granite mountains, skirting to the west. They are cut through in places by deep gorges, left us as the only trace of the force of former currents, which drained the adjoining territory to the north; and which, when swelled and infuriated by tempests and cloud-bursts, took in their grasp huge blocks of granite and trachyte, which now lie scattered about as boulders, to the north, west, and east of the town. At the base of these encircling mountains lies

A Belt of Dull, Brick-red Sandstone, Over 1,000 ft. thick. Its extent is seen on the west side of town, and its trend is for over 30 miles to the south. Following the northern sandstone arc, it flanks to the east and south, gradually sinking into the ground until the volcanic lava caps, and nearly covers it, leaving protruding masses like frowning rocks in a fiery sea. The whole belt takes the shape of a horseshoe. Back of these red sandstones, on the east and northeast, high sandstone tablelands extend, of variegated colors, from white, to gray, to yellow, beautifully banded, looking in the distance like formidable castles; a romantic picture in the glow of a setting sun.

Turning to the south of the town, we see a sandstone hill, about 1½ miles distant, which, through the action of volcanic forces, stands now boldly several hundred feet above the town's plateau. Underlying, as it formerly did, the surrounding sandstone country, it has since acted as a central wedge, around which the other strata have been grouped. Conformable to its east and west slopes, we see the strata dipping east and west, with a varying inclination of from 15° to 35°, striking in a northeast and southwest direction. On either side of this wedge we find a series of superimposed sandstones. These white sandstones being harder have withstood the weathering action better than the softer underlying shales, and their strike is clearly marked by protruding ribs or reefs, the intervening shales being washed or carried away to a depth of over 100 ft., forming a valley. Of these reefs we note three: the White, the Buckeye, and the Butts reef, overlying each other in the sequence named. Like the red sandstone before mentioned, which has the shape of a horseshoe with the open side on the south, so these reefs are grouped uniformly about the wedge above mentioned.

As to the age of the sandstones, little can be said with certainty, since so far no characteristic fossils have been found in them. Reeds and rushes are plentiful, but no leaf or shell has been traced to this locality.

The Reefs Themselves

Are made up of whitish-gray and red to reddish-brown sandstones, and between the reefs lie beds of clay shale, varying in color from blue to green to cinnamon brown. The ore occurs in similar strata of sandstone and clay shale. The reef is generally marked by a reddish micaceous sandstone, while the floor is made up of an arenaceous sandstone of a whitish color, with argillaceous sands underlying. The outcrop of the ore is marked on the east face of the reef, with the exception of those places where

off, as in portions of the Buckeye reef on its northwest side of the horseshoe. The ore is by no means confined always to one bed, but is limited to a silver zone of from 30 to 90 ft. wide, horizontally measured, and anywhere within this belt the horn-silver is liable to be found. As a rule it is more concentrated in certain layers (beds) of this belt, but in places it is so scattered as to bring the grade down to a uniform \$10, which at present does not pay to work. Frequently, also, the ore is thrown, in consequence of very fine slips, from one bed into another. Hence the giving out of the ore in one bed is not exactly a discouraging fact, for a cross-cut may, and very often does, prove it to have jumped into a lower or higher bed respectively. In other words, the argilliferous Sandstone Belt is Compound in Structure. The producing branches, two or three in number, run together in places, at least two of them do, and then again continue for long distances with barren strata between, which vary in thickness from 3 to 15 and even 30 ft. or more. In this depth, or following this dip, they have kept pretty well their own ground, but I have no doubt that what is now considered two and three separate beds will at a greater depth form but one bed throughout. The producing branches in all the mines change occasionally from a sandstone to a clay shale, even in the same bed, but certain portions of the reef show a preponderance of clay shale and argillaceous sandstone.

Of course the less clayish or argillaceous the sandstones, the less slimes are produced in the mill. The southern and part of the middle portion of the Buckeye reef, show less frequently vegetable remains than the remaining portion and the White reef, and in parts these remains are absent. In other parts, and this holds true for the whole district, we find the producing sandstone beds underlain by a stratum of highly argillaceous sandstones of variable thickness of from 10 inches to 2 ft., which carry much silver, and frequently show solid sheets of horn-silver along the seams of the thickness of a knife blade. I have known such seams to mill right along \$60 to \$130; unfortunately their occurrence is not as frequent as might be wished.

The Ore Itself

Is what is known as cerargyrite or chloride of silver, which, however, below true water-level will change to the sulphuret of silver, with native silver in places. Of the latter, two indications have been met with. A tested sample yielded in a certain mine only 65% of chloride of silver. This proportion will decrease in the ratio as water-level is passed, and the ore gets more outside of the reach of waters charged with oxygen and chloride of sodium. The grade of the camp is probably \$20 to \$25, though I have mined portions of beds which averaged right along \$35 to \$55, and others run as low as \$14 to \$17; and at times even \$8 and \$10. This question of

How the Silver Came into the Sandstone Has been discussed quite frequently in the camp, as may be imagined, and also among experts. The theory of contemporaneous deposition is held by some, while others hold that it has been deposited from ascending mineral solutions or vapors. I advocate the latter theory. I admit, at the first glance, one may be inclined to assume a contemporaneous deposition, inasmuch as the rushes and reeds coated and partially replaced with horn-silver, are plentiful, and a cursory examination may show in certain localities the silver to be confined solely to places where we find organic remains. However, such is not the case, taking the district as a whole. I have seen and mined portions in these beds, for a stretch of 200 consecutive feet, which were really absolutely void to the eye of organic remains, and still milled an average of say \$30; in spots as low as \$20 and as high as \$45 and \$53.

But grant for a moment that the silver was deposited contemporaneously with the sandstones. The first question to present itself would be, how did the silver get into the former sea?

From What Source did the Silver Come?

The surrounding border mountains have so far not been so kind to the prospector as to reveal any source of silver, and farther north we find either gold or lead mixed with ores containing silver. Now, then, if the silver was dissolved by the waters, and precipitated by the decomposing vegetable remains, why not the lead and the gold, of which no trace is to be found? Why is the silver limited to zones, outside of which no silver can be found? By this theory the silver should occur indiscriminately over a large area instead of being confined to limited belts, in close proximity to former volcanic centers, as at the reef, and in the district near Virgin City, upon North creek, a locality less known. Farther south we find the same beds carrying copper ores in rich quantities, a fact hard to explain under the theory of contemporaneous precipitation from above. The perfect and distinct occurrence of ore chutes, in the different producing beds, one chute underlying the other and separated respectively by 4 and again 30 ft. of barren rock, is likewise hard to explain by this theory. I refer to a certain instance in the Buckeye mine, near the Gad shaft, where there are three distinct producing branches, the top one being separated from the second one by 4 ft. of barren rock, and the second one from the third one by 30 ft. of unproductive ground, with a well-marked chute in each, one overlying the other.

In one locality should be at one time charged with silver so as to deposit argentiferous rock, and then, again, free from silver and deposit barren rock, as would be indicated on the theory of contemporaneous deposition by the alternations just mentioned.

We find in the same line of bedding, strata holding petrifications from 6 inches to 3 ft. thick, which contain no silver ore, while above and below it silver is found in good permanent grades in strata showing a scarcity of vegetable remains. Again, I have seen a stratum where the upper 2 ft. assayed about \$30, then 6 inches assaying \$100 or more, then 15 inches barren, and below it a layer of \$20 rock, all of the strata being full of petrifications.

From these and other facts, I form my opinion that the sandstones and silver have not been deposited at the same time, nor the ore deposited by precipitation from metallic solutions passing in from above, after the sandstones had been tilted.

At the time of the Volcanic Disturbance,

Metallic solutions, probably accompanied by steam and vapors, ascended from below and percolated through these sandstone beds, which at that time were most porous. The pressure decreasing, the vegetable remains in some parts, ferruginous masses in others, precipitated the sulphurets of silver (and copper in places), while at other points the silver was no doubt deposited by evaporation, as neither of the two precipitants is found. The upper portions, now changed to chlorides, are the result of surface waters, charged with oxygen and chloride of sodium, and the native silver found in places is the result of decomposition of the sulphurets. As at Steamboat springs to-day, where thirteen distinct openings (springs), emit steam and metallic vapors, at variable distances from each other, so did we have in those days different channels, which are now marked by the pay chutes. We can thus easily see how, according to the hardness and compactness of the sandstone beds, the solution percolated, 4 and 30 ft. apart, in the same direction, forming three ore chutes one under the other, or how the productive branches ran together and diverged again. As the thermal waters under pressure coursed through the lower strata of the earth, dissolving the silver from those rocks, portions of copper were dissolved with it from adjoining zones which gave rise probably to the copper deposits farther south. In places along this reef, the waters carried more copper in solution than in others, and through some molecular attraction, it seems as if the copper has more or less limited itself to certain permeable sand beds, while the silver has gone to the adjacent bed, according to the mechanical condition of the rocks, and no doubt the chemical nature of the precipitating agent. In places where the quantity of copper was but small in the ascending waters it has been deposited in the same bed with the silver. As to the occurrence of

Copper in the Silver Bed

I have observed a curious fact. If the copper present be azurite, or a grassy-green-looking malachite, the amount of silver in the bed will diminish, and it is a bad indication for the life of this particular chute. If the copper presents, however, a pale, but lively green, with a bluish shade in it, as we often find the stain on quartz ores, it invariably improves the grades of the silver ore. You may call it "kind" and "unkind" copper. I substantiated this on both reefs, and the trained eye will tell it at a glance.

Other objects of interest in the beds are occasional pieces of

Vegetable Matter Changed into Lignite.

Some of which will assay high in silver, and others again be free from it. They are, in instances, coated with native silver, and also intergrown in cases with pyrites, holding a very small amount of copper. In places trunks and branches of trees are found, some of which assay well, while others do not. The silver is not alone limited to the outside bark, but I tried pieces from the very interior of such branches, which I carefully washed and scrubbed, and they yielded as high as \$40 in silver. I also noticed, in the Buckeye reef, a six-inch seam of jasper, resting between sandstone and clay shale.

Cost of Working the Ores.

High milling charges and royalties have been drawbacks in the early days of the camp to the poor prospector, and the present regular rates could be well reduced, namely, 80% of assay value, 20% discount, and \$12 per ton for milling; returning only \$52 from a \$100 ore. In instances of big lots, the \$12 charge has been reduced to \$10 and \$9. Mill assay govern of course.

The bullion produced by the camp was, up to June 1st, 1880, according to Wells, Fargo & Co.'s receipts, 2,755,247 ounces of fine silver. To this ought to be added the value of the bullion produced from the ore at Salt Lake City and Pioche.

Taking the camp as a whole, it shows very well indeed, and it must be ranked among our good camps. If the companies now operating there will work their mines legitimately and systematically, the camp will continue to be for a long time yet, what it is to-day, a sure and steady bullion producer.

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Please address all communications to

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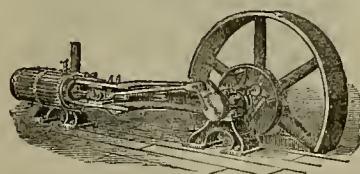
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Nos. 2 and 4 California Street, San Francisco.

Importers and Dealers in every description of

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Sole Agents for the Pacific Coast for



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Also on hand and for sale A FULL LINE OF MILL AND MINING SUPPLIES.

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Will Please take notice that we have taken the sole agency for the KNOWLES' STEAM PUMP, for the Pacific Coast States and Territories, and keep a full stock of Pumps and Duplicate Parts on hand at all times.

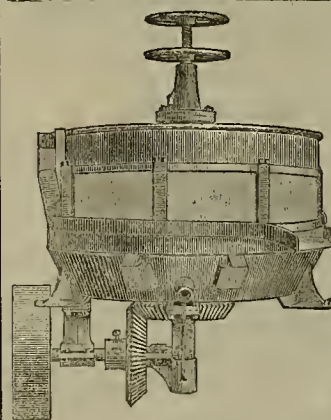
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Nos. 21 and 23 FREMONT STREET.

San Francisco, Cal., September 23, 1880.

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CONTINUOUS DISCHARGE AND GRINDING PAN.



This pan is designed to receive ore direct from a rock breaker, and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all; and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is simple, is a most important improvement in the working of gold ores, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adapted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

PERMANENT BEER TAP.

This Tap can be used in any keg. Or be regulated to draw Steam or Flat Beer, and is self-locking when the key is taken out.

Brewers' Rights, State Rights or County Rights for sale.

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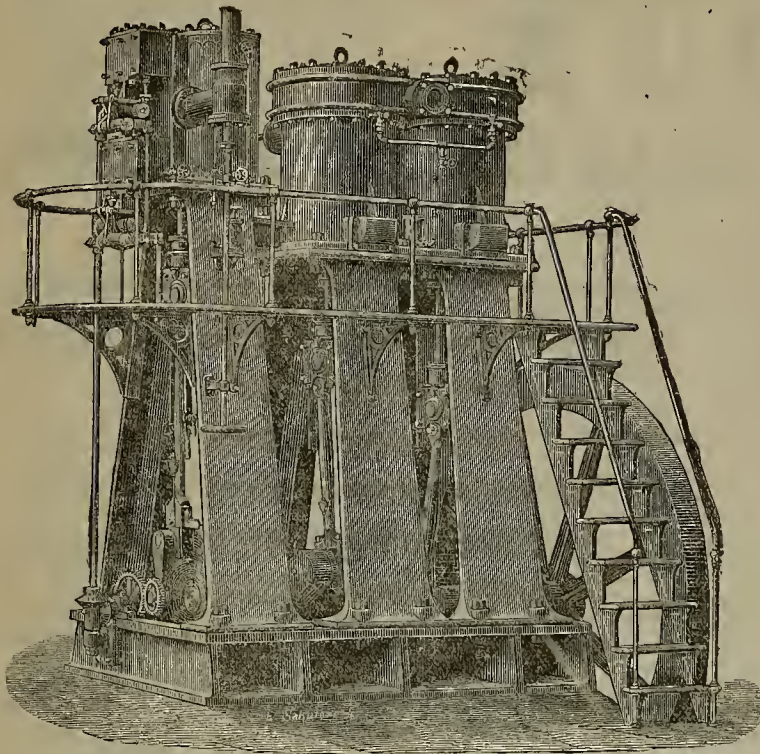
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AIR COMPRESSOR.

SPECIAL ADVANTAGES.

Absolute certainty in the action of the valves at any speed. Perfect delivery of the air at any speed or pressure. The heating of the air entirely prevented at any pressure. Takes less water to cool the air than any other Compressor.

Power applied to the best advantage. Access obtainable to all the valves by removing air chest covers. Entire absence of springs or friction to open or shut the valves. No valve stems to break and drop inside of cylinders.

Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

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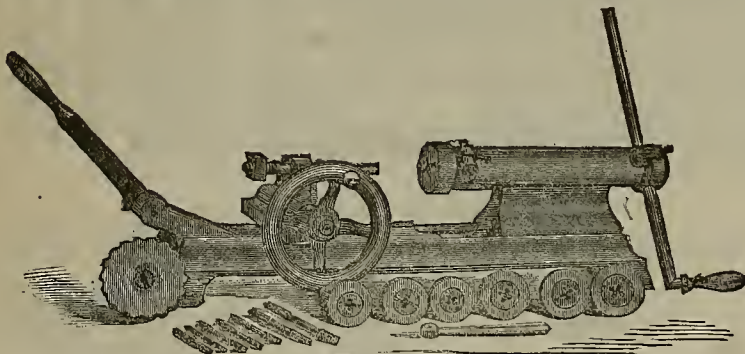
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WITH TAPS, DIES AND COLLETS COMPLETE.

B, Stock 23 inches long, 7 Taps and Dies Cuts $\frac{1}{4}$ to $\frac{3}{4}$ inch.
C, " 26 " " 7 " " " " " to 1 "
D, " 53 " " 6 " " " " " to $1\frac{1}{2}$ "

No. O. Lightning Hand Bolt Cutters and Tappers.



ESPECIALLY FOR CROOKED WORK!

Made to be bolted to the Bench or Table. Fitted with seven sizes, from $\frac{1}{4}$ to $\frac{3}{4}$ inch. Usual assortment, $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ inch.

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Nos. ONE, TWO and THREE.

Stronger, Better and Safer than any other High Explosive

Judson Powder

IS NOW USED IN ALL LAROE HYDRAULIC CLAIMS.

It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. Triple Force Caps and all Grades of Fuse.

BANDMANN, NIELSEN & CO.,

VULCAN BLASTING POWDER.

THE MOST ECONOMIC AND BEST NITRO-GLYCERINE EXPLOSIVE IN MARKET.

For the year 1881 we are prepared to make MOST LIBERAL ARRANGEMENTS. Having unequalled facilities we are in position to offer BEST TERMS, and purchasers will serve their own interest by conferring with the Company, before concluding arrangements elsewhere.

**No's 1, 2 & 3 Vulcan,
TRIPLE FORCE CAPS,**

**AND ALL GRADES OF FUSE AT BOTTOM RATES.
VULCAN POWDER COMPANY,**

218 California Street, San Francisco, Cal.

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Telegraph Supplies, Instruments of all Descriptions

FIRE ALARM TELEGRAPH BOXES, GONGS and BELL STRIKERS,

Model Machinery, Patent Office Models, Electro-Magnetic
Blasting Machines and Supplies.

AMALGAMATING PLATES.

1 oz. of Silver Deposit to 1 square foot for \$3.

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PAUL SEILER, Superintendent.

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OFFICE, NO. 6 CALIFORNIA STREET,
SAN FRANCISCO

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Iron and Steel Wire Rope
Flat and Round, for Mining, Shipping,
Hoisting and General Purposes.

Having the most complete and extensive Wire Rope Works in the United States, I am prepared to manufacture Wire Rope and Cables of any length or size at short notice, and guarantee the quality and workmanship equal to any made at home or abroad.

Iron, Steel and Galvanized Wire,
Of all sizes, on hand or made to order.

Barbed Fence Wire.

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For the Transportation of ores, etc.
Send for a Circular.

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PATENT DETACHABLE TOOTH SAWS,
Manufactory, 17 & 19 Fremont St., S. F.

**PATENT
CAL. METALLIC WINDOW SCREENS.**

This is the Best and Cheapest Window Screen ever offered to the public. Useful and Ornamental. To exclude Flies and Mosquitoes, it has no equal. It is an article of comfort, convenience and economy, and needs only to be known to be deemed a household necessity.

J. REARDON, 328 Bush St., S. F.

AIR COMPRESSORS
PRICES REDUCED. SEND FOR NEW CATALOGUE.
CLAYTON STEAM PUMP WORKS

Sierra County Drift Mines.

Both Sierra and Plumas counties are noted for their rich drift mines. The gravel deposits in these counties have in places yielded fabulous sums. Many of these deposits have been worked out, but there yet remain large tracts of land untouched by the miner. The little map presented beneath represents a section in the northwestern part of Sierra county which, though comparatively limited in extent, has at different times yielded millions of dollars. The section shown covers an area of about 10 square miles, yet it is credited with having produced in gold \$145,000,000. La Porte (which is in Plumas Co.) is supposed to have yielded from \$11,000,000 to \$13,000,000; Gibsonville, about \$8,000,000; Port Wine, \$10,000,000; Morristown and Craig's Flat, about \$7,000,000; Grizzly and Deadwood, \$3,000,000; Monte Cristo and Fur Cap, \$2,500,000; Eureka about \$3,000,000, and Sawpit Flat about \$3,000,000. It will be seen that this section has been exceedingly rich.

There yet remain several ridges satirically unprospected. These are, the Eureka, about seven miles long, between Canyon creek and Yuba river; Gibsonville, from La Porte to Gibsonville, eight miles. This latter is between Slate creek and South Feather river. The Union Valley ridge, six miles long, is between Onion Valley creek and South Feather. Gravel is known to exist there. Then there is Fowler's ridge, four miles long, between the headwaters of Dogwood (or the main Feather) and Black Rock. This has not been prospected.

A Chicago company has bought up the Gibsonville ridge from La Porte up three miles; and Hamilton Smith, Jr., and others, have bonds on the others from there to Gibsonville.

The Chicago Co. intend to begin work as soon as the snow is off. Another Chicago company (called the Blue Gravel Co.) has a bond on the Onion Valley ridge from the Pilot peak down, between Pilot peak and Grass Valley, Plumas Co., 743 acres in all. There have been developments already made, which has convinced everyone what there is there. They are said to have as good gravel as has been found in the northern country. A New York Co. is being formed to open the divide between Dogwood and Black Rock. They have over three miles of old river channel—2,000 acres. This Chicago Co. at La Porte is called the Bald Mt. Con. Co.; and they are preparing to commence operations as soon as the snow is off. The noted Monte Cristo mine at Spanish peak, owned by a Chicago Co., is paying very largely now.

There are many mines there which were supposed to have been worked out, which have been found, on further exploration, to contain plenty of gold. The Niagara, formerly called the North American, at Whisky diggings, has developed a channel running clean through the ridge to Hopkins' creek. They have begun on the other side to come back. This mine was bought by an English Co., who paid \$400,000 for it, and then sold it for about \$60,000, because they did not make anything out of it. Since then, the new owners have made a large amount of money out of it, and have only lately discovered that they have a big channel, and yet the mine has been worked over 16 years. The Empire, at Howland Flat, paid \$465,000 in dividends in four years, from a small strip of ground. The Bonanza, which joins the Empire, is said to be taking out gravel worth \$20 per carload. The Virginia, next to the Bonanza, is also getting out rich gravel. At the Pioneer and Gardner's Point they have had 300 men at work this summer, bringing in the water from St. Louis, it being brought across Cedar Grove ravine in a 34-inch pipe. They expect to run six monitors. The tunnel was owned by Chapman & Ralston originally. Work was stopped for want of money. Now they have raised up from the tunnel, and will drop gravel through this shaft and sluice through the tunnel. They are probably washing by this time.

The Pliocene Consolidated mine consists of over 6,000 acres of hydraulic mining ground, all owned by the Union Investment Co., of New York. This includes the mines at La Porte, Grass Valley, Spanish Flat, Bernard diggings, Spook's Point, Morristown and Craig's Flat. They have about 16,000 inches of water during the season, and are running over a dozen monitors. They have been working 300 men for two months past, till snow came. This Pliocene Co. are going to bring more water in by bringing the South Feather river through a tunnel under the Gibsonville ridge. The tunnel is to be 4,400 ft. long, and

about 2,100 ft. have been already cut. This and the Gardner's Point Co. will be the leading enterprises of this whole northern country.

Among the projected enterprises now being inaugurated is one called the Blue Gravel Consolidated, which consists of 4 locations, embracing a tract of something over 400 acres. It is on the well-known divide between the headwaters of the North Yuba and Big and Little Canyon creeks and covering about two miles of the old river bed, or ancient channel, which has been worked on both sides of their claims very successfully for years past.

The claims, as the map shows, are about three miles southwesterly from Table Rock, or Howland's Flat, and about the same distance northeasterly from the well-known Monte Cristo and Fur Cap mines. They are about two miles easterly from Morristown, Craig's Flat and Eureka North. The claims are entirely in virgin ground, and can be opened at three points, viz: from Reese ravine, Little Canyon creek or Saw-mill ravine, either of which are natural outlets for the claims, and all of which were very rich in gold. Saw-mill ravine would be deemed, perhaps, the most feasible, as the channel could be reached through a tunnel about 1,000 to 1,200 ft. long and at a cost of about \$15,000. Water sufficient to work the gravel is obtainable in Reese ravine and others on the claims, the year through, and the tunnel itself would probably afford considerable water for the same purpose. There is an abundance of timber on the claims. The claims can be reached by wagon road over Howland's Flat, five miles distant, and also by trail from La

Bullion Product.

A few weeks since we gave a resume of the work now being performed by the U. S. Mint officials in the collection of statistics, and information relating to the mining of the precious metals. At that time we mentioned that very shortly the figures of the bullion product for some of the States and Territories for this fiscal year had been compiled and would shortly be made public. The returns as given represent the bullion product for the fiscal year ending June 30th, 1880. The figures are as follows:

	Gold.	Silver.	Total.
California.....	\$13,951,618	\$1,045,453	\$14,997,071
Nevada.....	4,719,070	10,553,762	15,272,832
Oregon.....	451,182	983	452,165
Washington.....	410,500		410,500
Idaho.....	1,053,703	444,047	2,497,750
Arizona.....	300,199	2,011,319	2,311,518
Totals.....	\$21,886,272	\$14,358,454	\$36,244,726

It will be seen that these tables do not cover the whole field, the returns being incomplete. Utah, Montana, Colorado and Dakota not appearing. This looks as if our mint officials in San Francisco have worked up their district more carefully than the other people east of the Rockies had done.

The gold reported for California is from 33 counties, and is believed to be \$1,500,000 less than the actual yield. The silver reported comes from 24 counties, and is probably complete. The product for Nevada is the combined yield of the productive mines of 10 counties, and is regarded as very accurate. Seven coun-

Saving Float Gold.

We saw, this week, at Geo. M. Lederer & Co.'s, Bay City Plating Works, 731 Mission street, a very simple but effective device for saving float gold, which has, within the past year, been pretty extensively introduced in the mining regions of this State. It is well understood that in our milling system a certain proportion of the very fine gold is lost, passing away with the tailings. This is known as "float gold," as it floats on the surface of the water and does not, therefore, come in contact with the amalgamated plates or mercury in the sluices. This float gold occurs in places, as well as quartz mines. All sorts of devices, more or less complicated, have been used to prevent the loss.

About a year ago Mr. Lederer, when at Nevada City putting in a set of silver-plated amalgamated plates for the Providence Co., had his attention called to the matter of loss of float gold, and was asked, in a joking way, if he could not provide a remedy. On his return he thought over the matter, made a set of swinging plates and sent up. In two or three days he received an order for a lot of them, and since then has made many hundreds.

This swinging plate consists of a curved strip of silver-plated amalgamated plate, about three inches deep, and the width of the sluice or flume in which it is to be used. It is swung on eyes through which passes a wire rod, resting on the edges of the sluice. The plate thus hangs transversely to the current, with its concave face up stream, the plate being half submerged. The movement of the water will keep the plate swinging. The floating particles of gold cannot escape touching the plate, and are caught on the quicksilver surface.

It is found in practice that across the sluice, immediately under each swinging plate, is formed a line of amalgam, which has dropped from the plate as it accumulated. The gold which is caught on the plates is thus saved. These plates are hung in sluices, a few feet apart. Very wide ones have been made for the sluices of hydraulic mines. The plates cost so little, and are so effective, that they have come into extensive use in a very short time.

Lederer & Co. make a specialty of plating amalgamating plates for saving gold. They prepare their silver-plated copper plates in a different manner from which many do, and guarantee their weight and efficiency. In using common copper plates it takes some time to get them in proper condition; with the silver plated ones, they are ready immediately. They moreover feed themselves with quicksilver from the battery, never corroding, and requiring no handling to be kept clean. As the amalgam gets thick it is removed, and the plate will be kept "alive" from the battery. In fact, the value of silver-plated copper plates is now so well known, that they are very extensively used in place of the old copper plates, as they save their cost in a week or so. To quicksilver the plates, the mercury is rubbed on with a piece of flannel, using water, but no acid or cyanide of potassium. At these same works they have a process of removing gold from old copper plates without melting the plates. For this a charge of 10% of the gold obtained is made, saving the copper and allowing its value. Sometimes the old plates will pay for new silver plates. The old copper plates may be plated the same as new.

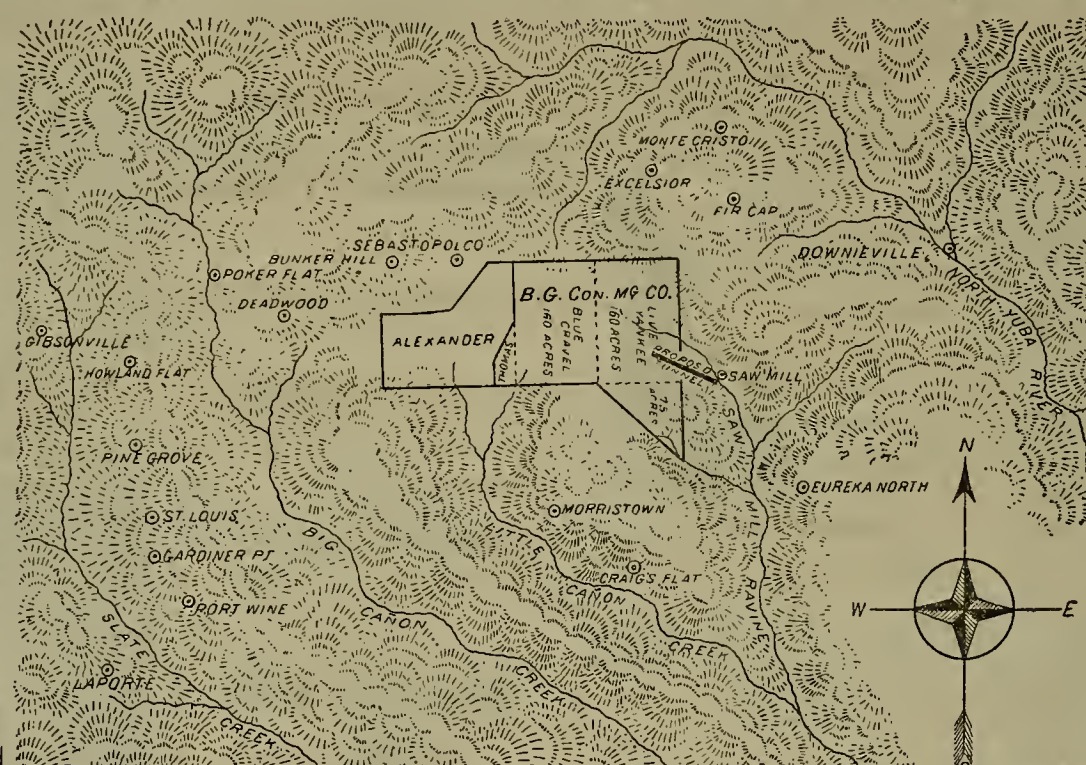
The foremen in the extensive foundries of Arlington, Yorkshire, who struck a short time since for an advance in their wages, have, to some extent, carried their point. The arbitrators appointed to decide the question between them and the masters have awarded them an increase of 7½% in their wages.

It is said that the prospects are good for the consolidation of the Raymond & Ely and Meadow Valley mining companies, at Pioche. This, of course, would put a stop to the trouble between the two companies that has existed for the past six years.

THE New York World, speaking of J. W. Mackay's arrival in Paris, says: At the conclusion of a prolonged tour in the East, he is expected to settle in New York.

THE Placerville gold quartz company have struck a bonanza in their shaft on the 600-ft. level. It is 90 ft. from the main ledge, but evidently leads to it.

A LARGE number of men are doing assessment work for themselves and others in the various mining camps.



MINING DISTRICTS IN SIERRA AND PLUMAS COUNTIES.

Porte and Port Wine, distant six miles. The way this property is to be opened will show how such enterprises are to be managed. The owners will convey the entire claims to a Trustee, to hold for a company to be formed by the investors who are to take charge of the property, construct the tunnel and such appliances as may be necessary to develop the claim.

The company is to have entire charge of their own expenditures, elect their own officers, agent and employees, and prosecute the work in their own way and at their own expense, but continuously and as expeditiously as possible, consistent with economical management.

When the tunnel is completed, claim opened and pay gravel obtained, the company is to have 250 shares more than one-half of the capital stock—or the controlling interest,—and the remainder belongs to the original owner or his assignees.

After pay gravel is obtained in the tunnel and the claims properly opened, and provided with necessary appliances for drift mining, should the claim not be self-sustaining and an assessment be required, all the stock or interests are to be assessed alike.

This arrangement is necessary for the reason that the owner requires capital to run the tunnel and open the claim. He therefore conveys the property on the conditions stated.

THE Salmon River mining and smelting company, have completed their smelter at the mouth of Kinikini, Utah, and everything is ready for the spring campaign. The Tribune says the company employs 12 men on the Silver Belle and 8 on the You Know mines, on Poverty flat. The ore now being extracted at the Silver Belle, samples 350 ounces silver per ton.

ties in Oregon report as above, but the yield of the State for that year was probably not less than \$1,000,000 in gold and \$10,000 in silver. Washington Territory is all that can be obtained from that source. The mine owners in nine counties in Idaho give their combined product as above. Six counties in Arizona report \$1,401,518.

Blanks are now being sent out to many companies, asking for information for the six months ending December 31st. As we have previously said, we hope that attention will be paid to the request of the mint officials, as all of the communications are held strictly private. Only the aggregate will be published.

The Gould & Curry Mine.

The annual meeting of the Gould & Curry Mining Co. was held this week, and the following trustees and officers elected: President, W. S. Hohart; Vice-President, A. B. Hull; Secretary, A. K. Durbrow; Superintendent, H. H. Penoyer. Directors—S. Heydenfeldt, George Coudon, Wm. Kohl, A. Hayward, Robt. Sherwood.

The Secretary's report shows the receipt of \$162,000 from assessments, and some \$38,000 from sales of supplies and machinery. The disbursements aggregate \$200,000, less \$15,000 on hand. The principal items of expense were \$18,314 for mill and mine supplies; \$15,000 for wood; \$32,975 for labor and salaries; \$77,250 for construction of Oshiston shaft.

The Superintendent, H. H. Penoyer, says that the machinery being in perfect order, and no unusual expense expected, the coming year should not be an unprofitable one. The joint B. & B. shaft has now attained a depth of 1900 feet; is entirely dry, and will be continued on down to a depth corresponding with the 2300 level of the C. & C. shaft; from which points our 2150' drifts and crosscuts will be run to determine the value of the ledge.

Mines of New Mexico.

The Silver City (N. M.) *Herald* says: Grant county is destined to be one of the richest, if not the richest, copper section in the world. At the east of Silver City lies Santa Rita, south and west the Burro mountains, in which new discoveries are being made and prospected with a great deal of energy.

Lone Mountain District.

Robert V. Newsham has struck a good streak of ore in his Gopher mine, assaying a large average in silver.

The Cossett mine remains closed, but for a short time only.

Santa Rita District.

The mines at Santa Rita will show their products in the market in a short time. Arrangements are being made to open up these copper veins, and it is felt that thorough work will be done in the development. These mines are well known and the copper has been of good quality.

At a point west of Santa Rita and near Fort Bayard, good copper indications have been discovered with assays running at a good average.

Burro Mountain District.

The assessment work is being done on the various copper locations. New discoveries are being made as the work of sinking shafts progresses, which give great encouragement. Messrs. Bullard & Co. are at work upon their claims and from results thus far, these copper mines appear to be of great value.

Lake Valley.

The Lincoln mine, owned by John A. Miller, shows a fair average ore. About a ton was lately reduced at the Mimbre works, running 584 ounces to the ton. Parties from New York and Washington have become interested and speak of putting considerable capital in developing.

Silver Flat.

The Mass. & New Mexico Mining Co.'s mill, running night and day, has reduced a large quantity of ore, and from the appearance of the amalgam one would judge it to be a fair quality. The machinery, since getting the smoothness and rough edges worn, is running with great ease and regularity, and all the employees are becoming accustomed to its peculiarities.

In going over the mine one finds a large quantity of ore assorted and stacked, they now having four men on the different dumps assorting, with more ore in the various shafts and drifts, which will be hoisted as the occasion requires. The water, which was a source of trouble some time ago, is such no longer, they having an abundant supply. As was reported a shipment of bullion was made by the managers about a week ago, and we understand another lot will be sent to the Boston office in due time.

Mill Work at Silver Reef, Utah.

We take the following remarks from a paper read recently before the American Institute of Mining Engineers, by Chas. M. Rolker:

Some of the ore slimes contain more than others. The limits lie about between 5% and 33%. I know of cases where 45 tons were stamped to get 30 tons for the pans. The folly of that is apparent, as settling tanks are cheaper than the cost of hauling it out of the slime-pits, with the cost of having hauled it from the mine, and the interest on the money while it must lie in the pit, added to it. However, this is being remedied fast.

The amounts of salt and bluestone used in milling are naturally very variable, according to the locality of the reefs from which it is taken. The limits probably lie between—bluestone, 1 2-10 lbs. to 5 lbs. per ton; salt, 15 lbs. to 50 lbs. per ton. The loss in quicksilver varies from 1 1-15 lbs. to 2 1-2 lbs. per ton.

The total cost of milling varies at the mills from \$3.55 to \$6 per ton, to which the cost of ore-hauling has to be added, except in case of the Barhee & Walker mine which has no ore-hauling charges. All, except the Stormont mill, are steam mills; it is also the only 10-stamp mill of the district. The stamps in use, when new, weigh 750 lbs., and with a fall of 6 inches make from 80 to 100 drops per minute. The batteries have 40-mesh screens. The Stormont mill has 6 blanket sluices, 130 ft. long, 14 inches wide, 5 inches deep, inclined under 3°—the only one in the camp. The pans of the district are rated at a ton and a half. The fineness of the bullion varies from 700 to 987 fine.

Tailings vary from \$3.25 to \$10 per ton, varying with the localities in the different reefs. Slimes are generally richer than the ores from which they are produced. The cost of mining is likewise variable, depending on the condition of the mines, i. e., on the amount of prospecting and dead work to be done, or the construction required, and ranges between the limits of \$4.50 and \$9.50 per ton. The total cost of these ores, including bullion charges, ranges from \$14 to \$17 per ton.

RAILROAD PROGRESS IN THE UNITED STATES.—*Railroad Gazette* of October 8th, reports the construction of 3,938 miles of new railroad up to that date during the present year, as against 2,328 miles constructed for the same period of 1879, 1,320 miles in 1875, 1,505 miles in 1877, and 1,719 miles in 1876. At the rate indicated, the year 1880 will not fall far short of 5,000 miles of new railroad.

Business Directory.



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Upright and Horizontal

Engines & Boilers

A SPECIALTY.

Upright Engines
from One to Ten
Horse-power.



SAVE YOUR GOLD AND SILVER.

I am prepared to demonstrate, if miners will bring me from 500 pounds to a ton of their ores, that I can save from 25 to 100 per cent. more than any other machinery now in use. I will make no charge.

Machinery can be seen in operation every day at
No. 143 Fremont Street.

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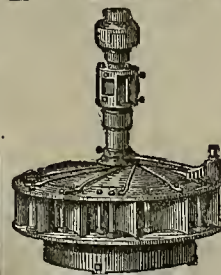
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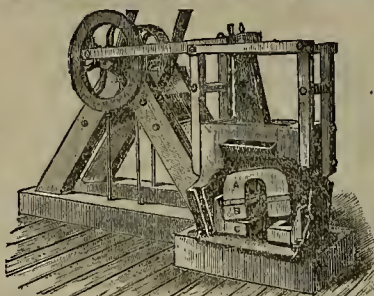
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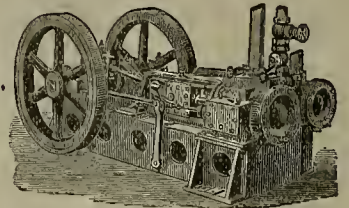
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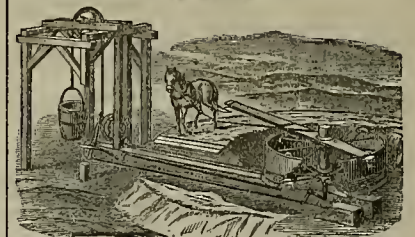
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," Dewey & Co., Publishers and U. S. and Foreign Patent Agents.

235,505—AMALGAMATING MORTAR—Joshua S. Buck, Oakland, Cal.
235,417—DOOR HINGE—J. Decombe, S. F.
235,359—SEAL LOCK—Abraham Halsey, S. F.
235,433—THILL COUPLING—G. W. Hunter, Merced, Cal.
235,444—EXTRACTING CARTRIDGE SHELLS—James F. Marvin, Fort McDowell, Arizona.
235,573—WATER CLOSET VALVE—W. M. Sack, Oakland, Cal.

2,371—LABEL—Benj. Hastings, S. F.
2,373—LABEL—John R. Williams, Stockton, Cal.
FOR THE WEEK ENDING DECEMBER 14TH, 1880

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

WATER CLOSET VALVE.—Wm. M. Sack, Oakland, Cal. Patented December 14, 1880. No. 235,573. This device consists in connecting with the supply and discharge pipe two oppositely placed pipes opening into opposite sides of a globe or water chamber carrying an elastic diaphragm, a four-way valve being placed at the junction of the four pipes, said valve being operated by a lever connected with the closet seat. On the depression of the lever by the weight on the seat the valve allows a certain amount of water to pass through one of the pipes into one side of the water chamber, the pressure of this water expelling that already in said chamber and discharging it into the bowl.

HINGES.—Joseph Decombe, 311 East street, S. F. Patented Dec. 14, 1880. No. 235,417. This device relates to improvements in hinges which are especially applicable to double doors, and it consists in a peculiar and novel construction in which two leaves of the hinge, one for each of two doors, are supported upon the same hinge pin; the latter being projected out from the point at which the hinge is secured, the thickness of the doors. This allows doors to be hung so that the post is reduced to a minimum, and is entirely concealed from the front when the doors are closed. When opened, only the thickness of the two doors, as they stand back to back, will be exposed. As many of these doors may be thus hinged in pairs as will extend across the space to be divided off. When opened they will throw the two contiguous apartments into one room with but little obstruction by reason of the posts and doors.

ECCENTRIC COUPLINGS.—Geo. W. Hunter, Merced, Cal. Patented December 14, 1880. No. 235,433. This device relates to a novel coupling which may be employed for various purposes, such as securing poles or shafts to vehicles, to the union of the lengths of rods, such are used in well boring and for other purposes. It consists of a rounded head secured to the front axle or the rod, or pole to be connected, having a hole in its center in which is fitted a short cylinder which will turn easily. This cylinder has a slot in one side, to receive the shaft iron or bolt, and the head has a slot to admit it; after which the cylinder is turned until the slot in the cylinder no longer corresponds with that in the head. Lugs upon the cylinder retain it in the head, and a spring latch prevents the head from turning to free the bolt.

WASHING MACHINE.—George M. Pursell, San Jose, Cal. Patented December 7, 1880. No. 235,168. This invention relates to certain improvements in that class of washing machines which consists of a semi-cylindrical containing body and a similarly-shaped rubber, which is adapted to be oscillated or rotated about an axis, so that the clothes may be rubbed between the corrugated surfaces of the two.

Bullion Shipments.

Under this heading we give all shipments since our last issue. We will be glad to receive further reports:

Northern Belle, Dec. 13th, \$6,358; Western, Dec. 14th, \$12,536; Northern Belle, Dec. 15th, \$6,080; Ontario, Dec. 13th, \$10,463; Stormont, Dec. 14th, \$6,711; Christy, Dec. 13th, \$2,244; Ontario, Dec. 14th, \$3,643; Horn Silver, Dec. 15th, \$5,000; Ontario, Dec. 15th, \$5,306; Christy, Dec. 15th, \$4,779; Barbee & Walker, Dec. 15th, \$1,781; Christy, Dec. 16th, \$2,334; Horn Silver, Dec. 16th, \$2,500; Ontario, Dec. 16th, \$3,719; Horn Silver, Dec. 18th, \$7,500; Ontario, Dec. 17th, \$4,291, 18th, \$3,948; Barbee & Walker, Dec. 18th, \$2,151; Con. Virginia, Dec. 18th, \$58,335; Northern Belle, Dec. 18th, \$9,027.15; Western, Dec. 18th, \$216,22.30; Northern Belle Isle, Dec. 20th, \$13,700; Grand Prize, Dec. 20th, \$11,600; Bodie, Dec. 20th,

Mechanics' Institute.

The Board of Trustees of the Mechanics' Institute have purchased for \$175,000 a lot 382x275 ft, between Polk, Laguna, Hayes and Grove streets. They have also decided to dispose of the old building on Post St. The old premises are worth upwards of \$100,000, and when they are disposed of the money will be paid on the new lot.

This move has been in contemplation for a long time. The quarters on Post St. are contracted, and the building not particularly well adapted for the purpose even of a library. The Institute has in its day had to put up a number of temporary structures for exhibition buildings, but it is now proposed to erect a permanent one on the lot recently acquired. They will probably hold another fair in the old building on Eighth St., next August, as they will need all the money they can raise to pay for the lot. Even then they will probably have to run in debt for a building.

It is the intention to put up a substantial brick, stone and iron building, large enough for exhibition purposes. In addition to the large main floor space they can have two galleries, and still have room for library and reading rooms. It will probably be three or four years yet before all these plans can be carried out, and by that time the City Hall will be perhaps nearly completed. The center of the town is gradually going in that direction and the Institute building will then be in a central location.

With a permanent building belonging to the Institute, the expense of the fair will be reduced greatly. They will probably not have such a needlessly large structure as they have now—one difficult to properly fill. Everything is spread over too much surface to have any neat and artistic appearance at the fairs held in the Eighth St. building; but in the new one closer scrutiny can be exercised.

The purchase of the new lot and the contemplated improvements are an evidence of progress on the part of the Mechanics' Institute at which all its friends will rejoice. The library is a favorite one, and the efficient librarian has exercised very good judgment in arranging the books so as to be convenient for the subscribers. The attendants are affable and courteous, and the whole institution deserves the success it has met and is meeting.

Elegant Christmas Cards.

We acknowledge the receipt of a box of elegant Christmas cards from L. Prang & Co., of Boeton. These cards are all beautiful and chaste in design, and executed in the highest style of the art. In addition to a large number of smaller ones of lesser note, we notice four large size cards, which are reproductions of the designs for Christmas cards, which received the prizes in the competition last spring held under the auspices of the American Art Gallery in New York.

The first of these four designs is by Miss Rosina Emmet, who received therefor the award of \$1,000. Upon this card is a panel upon which is represented five boyish choristers chanting the praises of the "New-born Child." This panel stands out upon the black ground of a larger and more dimly outlined picture, suitably embellished with figures and flowers, and verses.

The other three designs are also elaborate and artistic efforts, the authors of which were rewarded respectively with the sums of \$500, \$300 and \$200.

It is marvelous to notice, from the samples before us, the advance which has been made in this particular line of chromo-lithography, since Prang & Co., a few years ago, gave us their first attempts in the art, which consisted of nothing better than a stem of currants, a twig of the red berries of the barberry bush, a bunch of apple blossoms, or something of a similar kind, in one corner of a white or tinted card.

This improvement has grown out of the popular enthusiasm for decorative art, which has of late taken such a hold upon the masses everywhere, and which is doing so much to elevate and refine our people. It is to this firm, more than to any one other, that the public is indebted for this growing taste for art, and which is doing so much to create and perpetuate a warm-hearted feeling of good-fellowship between man and man. Let those who desire to cultivate this taste in their families and among their friends, unite in the time-honored observance of "Merrie Christmas" by a free circulation of these elegant greetings, which may be had in endless variety of Mr. J. H. Dorey, at 527 Commercial street.

THE Western Mining Co., Saturday, declared an extra dividend of 75 cents per share, or \$75,000, payable on the 20th. The regular dividend of the same amount was paid on the 10th. This is intended as a Christmas present to stockholders. The mine is in the Tomstone district, Arizona. It was formerly known as the Contention. Dividends of 75 cents per share were commenced last July, and have been paid every month since. The aggregate being

News in Brief.

TROOPS are being landed in Ireland. THE Basuto war is rapidly spreading. THE Kurde have returned to Turkish territory.

SCARLET FEVER and diphtheria are raging in New York.

THE steam dredger *Samson* is at work in Petaluma creek.

THREE eight shocks of earthquake at Los Angeles Sunday.

OR 150 cases of diphtheria in Brooklyn last week, 50 were fatal.

ACCORDING to the census returns, the population of Oregon is 174,767.

THE Queen has knighted Edward Baine, editor of the *Leeds Mercury*.

ENGLAND is likely to have another war on her hands in the Transvaal.

IT is proposed to divide Dakota, and make a State of the southern portion.

THE Little River mill, Mendocino county, have shut down for the winter.

EMILE DE GIRARDIN, the great French journalist has retired from public life.

THE peak of the St. Helena mountains were white with snow last Friday morning.

A SANGUINARY fight has taken place between the Armenians and the Turkish troops.

IT is again rumored that the Czar of Russia is about to abdicate in favor of the Czarevitch.

THE Second Chamber of Holland has voted a grant of 7,000 guilders for an Arctic expedition next year.

THERE is a good deal of defection in British Columbia, against the Dominion. Secession is talked of.

COMMODORE THOMAS S. PHELPS has been ordered to the command of the Mare Island Navy Yard.

A DISASTROUS fire has occurred at Rangoon, British India. The damage is estimated at 19 lacs of rupees.

THE New York *Herald* says: Gen. McDowell is a close personal friend of Garfield, and may be Secretary of War.

THE Boers of the Transvaal, South Africa, have thrown off the English yoke and re-established the Republic.

THE Russian Government has ordered 12 torpedo cutters, at a cost of £10,000, for the Russian fleet in Chinese waters.

TWO infernal machines were received last week by Hayward Bros., of Alameda. They fortunately did not explode.

A MANIFESTO against the Canada Pacific syndicate contract has been issued by the Opposition in the Dominion Parliament.

IT is proposed to make the anniversary of the discovery of America a national holiday, as far as possible, by act of Congress.

PRIVATE intelligence from Gen. Skobloff shows, in spite of all contrary assertions, that the Tekke campaign has already begun.

GOV. WILTZ of Louisiana has ordered the planters to take care of their own levees, as the State is unable to make the necessary repairs.

THE January interest from the Treasury Department will cause 70,000 checks to be issued. The payments will be \$15,731,000, but, added to other bond liabilities, it will equal \$24,000,000.

M. S. BEACH, while recently plowing in his field in the northern part of Marysville, turned up with the sod an old gold watch that had apparently been buried there many years.

THE New York Board of Health has prohibited public funerals in the case of persons dying of cholera, yellow fever, small-pox, scarlet fever or diphtheria. Such a prohibition should be universal.

THE Chief of the Bureau of Statistics reports the total value of exports of domestic breadstuffs for the 11 months ending November 30, 1880, to be \$256,762,380. For the same period in 1879 it was \$230,791,604.

AT San Diego grading has commenced on the first 18 miles from San Diego on the California Southern road. The ground is in fine condition, being softened by late rains. Seven large gangs of men are at work.

THE clergy of all the Roman Catholic and several of the Protestant churches of Montreal, Sunday, denounced Sara Bernhardt in strong terms, warning their people against patronizing her performances this week.

IT is officially announced that the allotment of Panama canal shares will be as follows: Applications for from one to five shares will be accepted in toto; subscribers for from 6 to 20 shares will receive 6%, and those from 20 upwards will receive 25% of their demands. Installments of 100 francs per share must be paid before the 30th inst.

A NUMBER of the Irish landlords are now advocating, as a compromise, the adoption of the "three F's" policy—meaning fair rent, fixity of tenure, and free sale. Lord Rossmore's meeting of Orangemen made this policy its platform. The London *Times* advocates this plan of settlement. Fixity of tenure was a year ago denounced by the landlords as utterly inadmissible.

THE antagonism between the proprietors of the coil and the tenants in Ireland is becoming more and more bitter. It is daily showing itself in the Boycotting of obnoxious landlords. The machinery of the law, which has been evoked in aid of the prescriptive rights of the sentry, is also clogged by the refusal of many of the smaller freeholders to appear at the As-

Quinine and Arsenic

Form the basis of many of the Ague Remedies in the market, and are the last resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. AYER'S AGUE CURE is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent and certain, and no injury can result from its use. Besides being a positive cure for Fever and ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive as well as cure, of all complaints peculiar to malarious marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

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OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORNE—San Francisco.
A. C. KNOX—Pacific Coast.
O. W. McOREW—Santa Clara county.
M. P. OWEN—Santa Cruz county.
J. W. A. WRIGHT—Merced, Tulare and Kern counties.
N. E. BOYD—San Bernardino and Los Angeles counties.
JARED C. HOAG—California.
O. M. THOMPSON—Fresno county.
B. W. CROWELL—Colusa and Yolo counties.
D. W. KELLERHER—Fresno, San Benito, Monterey and San Luis Obispo counties.
W. O. WARNOCK, Sonoma County.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omissions of agents.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Chew JACKSON'S BEST Sweet Navy Tobacco

METALS.

(WHOLESALE.)

WEDNESDAY M., Dec. 23, 1880.

IRON.—		
American Pig, soft, ton.....	\$2 00	@ 33 00
Scotch Pig, ton.....	26 00	@ 27 00
American White Pig, ton.....	—	@ —
Scotch Pig, ton.....	—	@ —
Refined Bar.....	44 00	@ 81
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ 9
Norway, according to thickness.....	8 1/2	@ 9 1/2
STEEL.—		
English Cast, lb.....	18	@ 18
Black Diamond, ordinary sizes.....	13	@ 15
Drill.....	9	@ 10
Flat Bar.....	—	@ 16
Plow Steel.....	9	@ 10
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 20
Sheathing, Tinned 14x18.....	—	@ 42
Nails.....	—	@ 42
Bolts.....	38	@ 13
Old.....	—	@ 23
Bar.....	—	@ 23
Precipitate, 100 fine.....	18	@ 19
LEAD.—		
Pig.....	4 1/2	@ 5
Sheet.....	—	@ 6
Pipe.....	—	@ 8
Pipe, Soil.....	—	@ 9
Shot, Discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Buck.....	—	@ 2 50
Chilled ".....	—	@ 2 50
TIN PLATES.—		
10x14 C Charcoal.....	—	@ 10 50
10x14 C Coke.....	—	@ 10 00
Banca Tin.....	—	@ 26 00
Australian.....	—	@ 20 00
I. C. Charcoal, Roofing 14x20.....	—	@ 10 00
20x23.....	20	@ 21 00
ZINC.—		
By the Cask.....	—	@ 10
Zinc, Sheet 7x3 ft, 7 to 10, lb, less than cask.....	10 1/2	@ 11

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company,
SAN FRANCISCO, CAL., DECEMBER 10, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 33, of Fifty cents (50c.) per share, was declared, payable on Wednesday, December Fifteenth (15th), 1880. Transfer books closed on Monday, December Thirteenth (13th), 1880, at three o'clock P. M.

W. M. WILLIS, Sec'y.

Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company.

Nevada Block, Room 37, San Francisco, Dec. 15, 1880.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 02) of Fifty (50) Cents per share was declared, payable on Monday, December Twentieth (20), 1880. Transfer books closed until the Twenty-first (21) instant.

W. W. TRAYLOR, Sec'y.

Amusements.

BALDWIN'S THEATER.

THOMAS MAGUIRE.....Manager.
CHAS. H. OGDON.....Treasurer.
J. P. CHAPMAN.....Assistant Treasurer.

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Cornor Market and Powell Streets. Open every evening and Saturday matinee. Box office open daily.

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Eddy Street, between Market and Mason. Open every evening.

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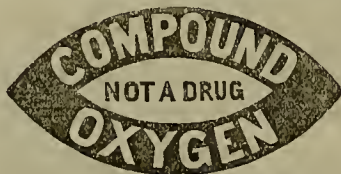
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For Consumption, Asthma, Bronchitis, Dyspepsia, Catarrh, Headache, Debility, Rheumatism, Neuralgia and all Chronic and Nervous Disorders. It is taken

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Trial before purchase. Don't waste your money otherwise. Send for free pamphlets. (Address H. E. Matthews, as above.)

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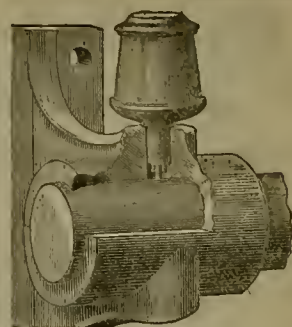
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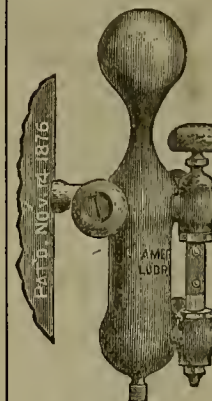
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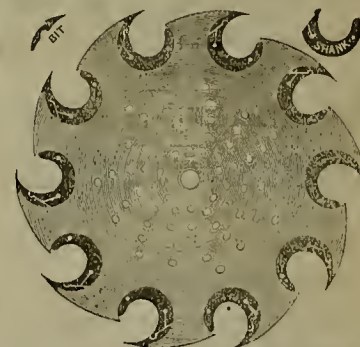
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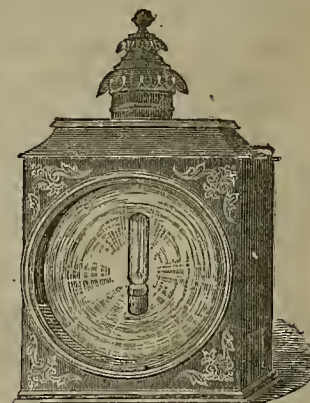
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Having Built nearly every successful working Furnace on the Coast, we are prepared to guarantee the best results
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Beyond Question the most economical and perfect working Engine now made.

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The only successful Chloridizing Furnace made. Over fifty of them in use on this Coast.

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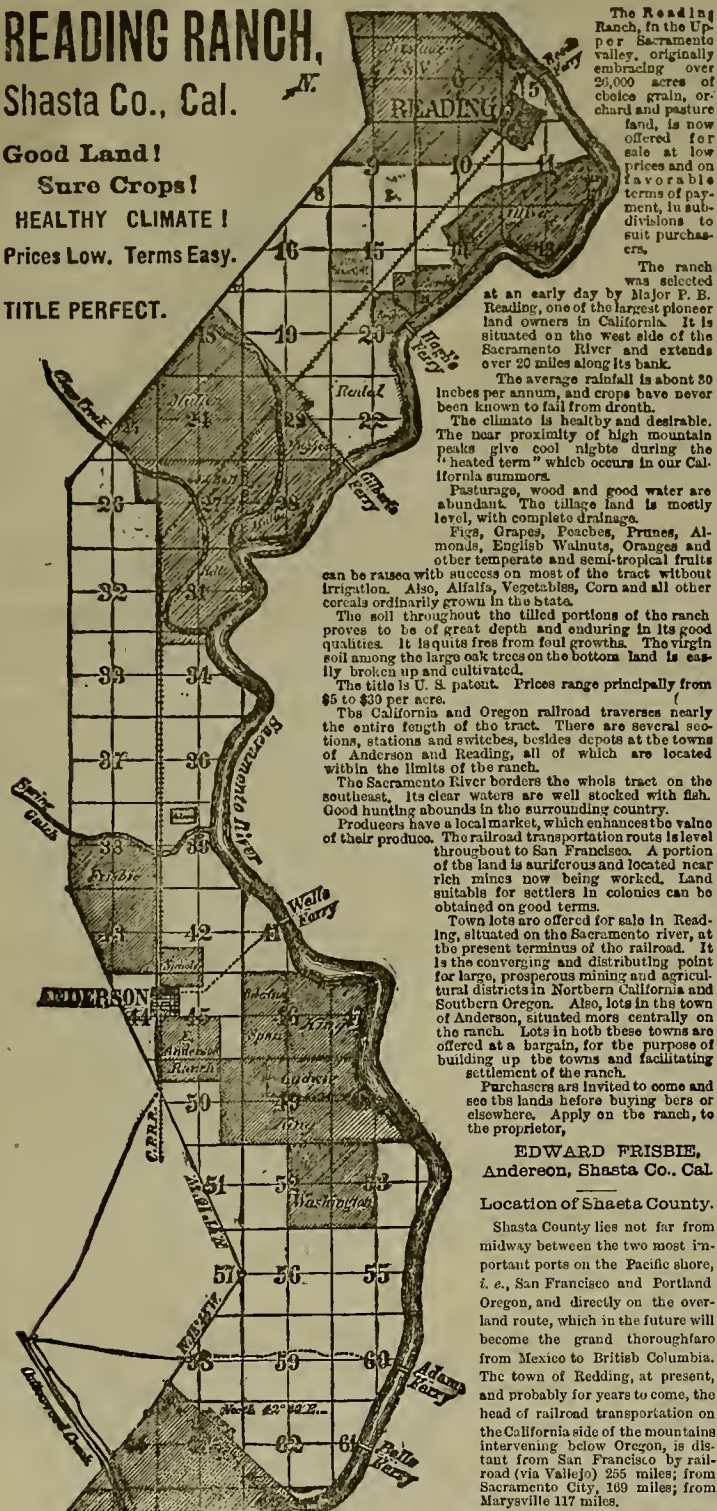
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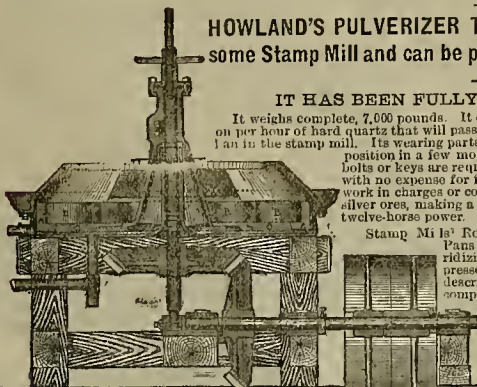
Shasta County lies not far from midway between the two most important ports on the Pacific shore, i. e., San Francisco and Portland Oregon, and directly on the overland route, which in the future will become the grand thoroughfare from Mexico to British Columbia. The town of Redding, at present, and probably for years to come, the head of railroad transportation on the California side of the mountains intervening below Oregon, is distant from San Francisco by railroad (via Vallejo) 255 miles; from Sacramento City, 169 miles; from Marysville 117 miles.

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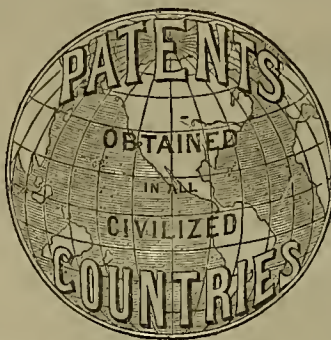
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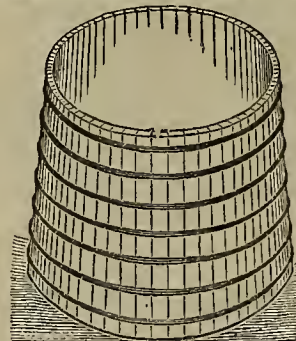
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